

# **SARVAJANIK COLLEGE OF ENGINEERING & TECHNOLOGY, SURAT**



**5<sup>th</sup> SEMESTER**

**Subject**

**"REMOTE SENSING & GIS"**

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**PRACTICAL: - 1**

**Prepare a report on Google Earth Pro Features**

- **Introduction**

Google Earth Pro is a fantastic tool created by Google that allows you to embark on an exciting virtual journey, exploring our planet like never before. With its interactive 3D maps, you can fly across the Earth's surface, viewing breath-taking landscapes and famous landmarks from different angles. Zoom in to get a closer look at specific locations or zoom out to see the entire world laid out before you.

One of the standout features of Google Earth Pro is the ability to access historical imagery. Travel back in time and see how places have changed over the years with past satellite images. Witness the evolution of cities, the growth of forests, and the impact of natural disasters. This feature is not just fascinating for history enthusiasts but also invaluable for researchers and urban planners who can analyse changes in the environment and urban development.

Google Earth Pro offers handy measurement tools that allow you to calculate distances, areas, and even heights accurately. Whether you're planning a road trip, measuring the size of a park, or analyzing terrain elevation, these tools come in handy. It's a powerful resource for professionals in fields like surveying, construction, and environmental studies.

- **Basic Features**

1. **Interactive 3D Maps** : Google Earth Pro provides detailed and interactive 3D maps of the Earth's surface, enabling users to explore various locations from different angles.
2. **Historical Imagery** : Users can view past satellite imagery and explore how places have changed over time with historical imagery.
3. **Measurement Tools** : It offers tools for measuring distances, areas, and heights, helping users get accurate geospatial measurements.
4. **Import and Export Data** : Google Earth Pro allows users to import and export geographical data in various formats, enhancing data analysis and visualization.
5. **Movie Maker** : Users can create virtual tours and videos of their exploration using the Movie Maker feature.

- **Applications**

1. **Geospatial Analysis** : Google Earth Pro is utilized for geographic research, urban planning, environmental studies, and disaster preparedness.
2. **Education** : It serves as an educational tool for students and educators to learn about geography, history, and earth sciences in an engaging manner.
3. **Tourism and Travel Planning** : Tourists can use it to explore destinations, find landmarks, and plan trips in a virtual environment.
4. **Public Demonstrations and Events** : It is used for public demonstrations, presentations, and events to showcase geographical information.
5. **Aerial Photography and Videography** : Google Earth Pro assists photographers and videographers in capturing aerial shots and visual content.

- **Advantages**

1. **User-Friendly Interface** : Google Earth Pro features an intuitive interface that makes it easy for users to navigate and explore.
2. **Extensive Coverage** : It provides a vast database of geographic data, including 3D imagery, street view, and historical data.
3. **Powerful Tools** : Google Earth Pro offers powerful tools for geospatial analysis and measurement, aiding researchers and professionals.
4. **Interactive and Engaging** : Its interactive 3D maps and features create an engaging experience for users.
5. **Free Access** : Google Earth Pro is available for free, making it accessible to a wide range of users.

- **Disadvantages**

1. **Internet Dependency** : Google Earth Pro requires a stable internet connection to access most features and data.
2. **Limited Offline Use** : Some features may not be available offline, restricting access in areas with no internet connectivity.
3. **Hardware Requirements** : To run smoothly, it may require a computer with decent hardware specifications.

## **2.1**

### **Flight Simulator For Virtual Flying**

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## I. Google Earth Pro Flight Simulator :-

### 1. Accessing Flight Simulator :

- Launch Google Earth Pro on your computer. To access the Flight Simulator, go to the "Tools" menu and select "Enter Flight Simulator" or use the keyboard shortcut (Ctrl+Alt+A or Command+Option+A for Mac).

Step 1:- Go to Menu bar - Tools - Choose Enter Flight Simulator

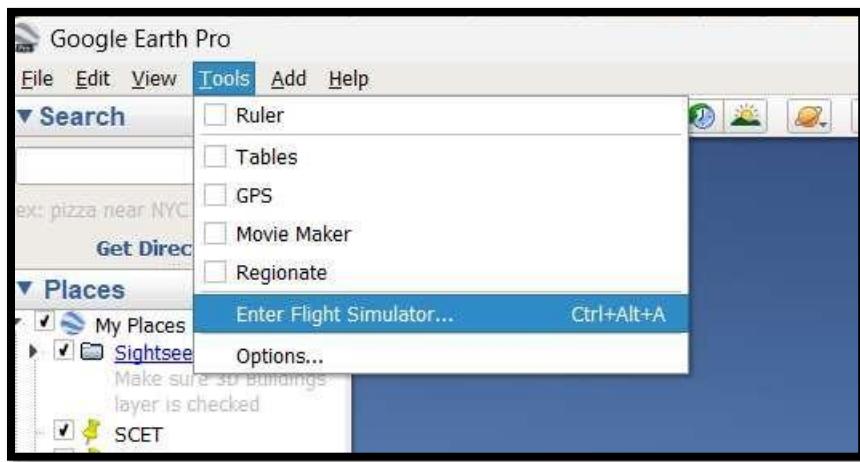


Figure 1.1

### 2. System Requirements :

- Ensure that your computer meets the system requirements for running the Flight Simulator feature smoothly. This may involve checking the minimum hardware specifications, graphics card compatibility, and software prerequisites.

1. **Supported Operating Systems** :- Windows, Linux, MacOS.
2. **Processor** :- A multi-core processor with a clock speed of at least 2.2 GHz is recommended.
3. **RAM (Memory)** :- Your computer should have at least 4 GB of RAM to run Google Earth Pro and the Flight Simulator feature effectively.
4. **Internet Connection** :- A stable internet connection is required to access Google Earth Pro and load high-resolution imagery and 3D models.
5. **Input Devices** :- You can use a keyboard, mouse, joystick, or game controller to control the Flight Simulator.

### **3. Acquiring Navigation Skills :**

- Familiarize yourself with the navigation controls in Google Earth Pro, such as zooming, panning, and rotating the view. Understanding these controls is essential for effective manoeuvring during the Flight Simulator experience.

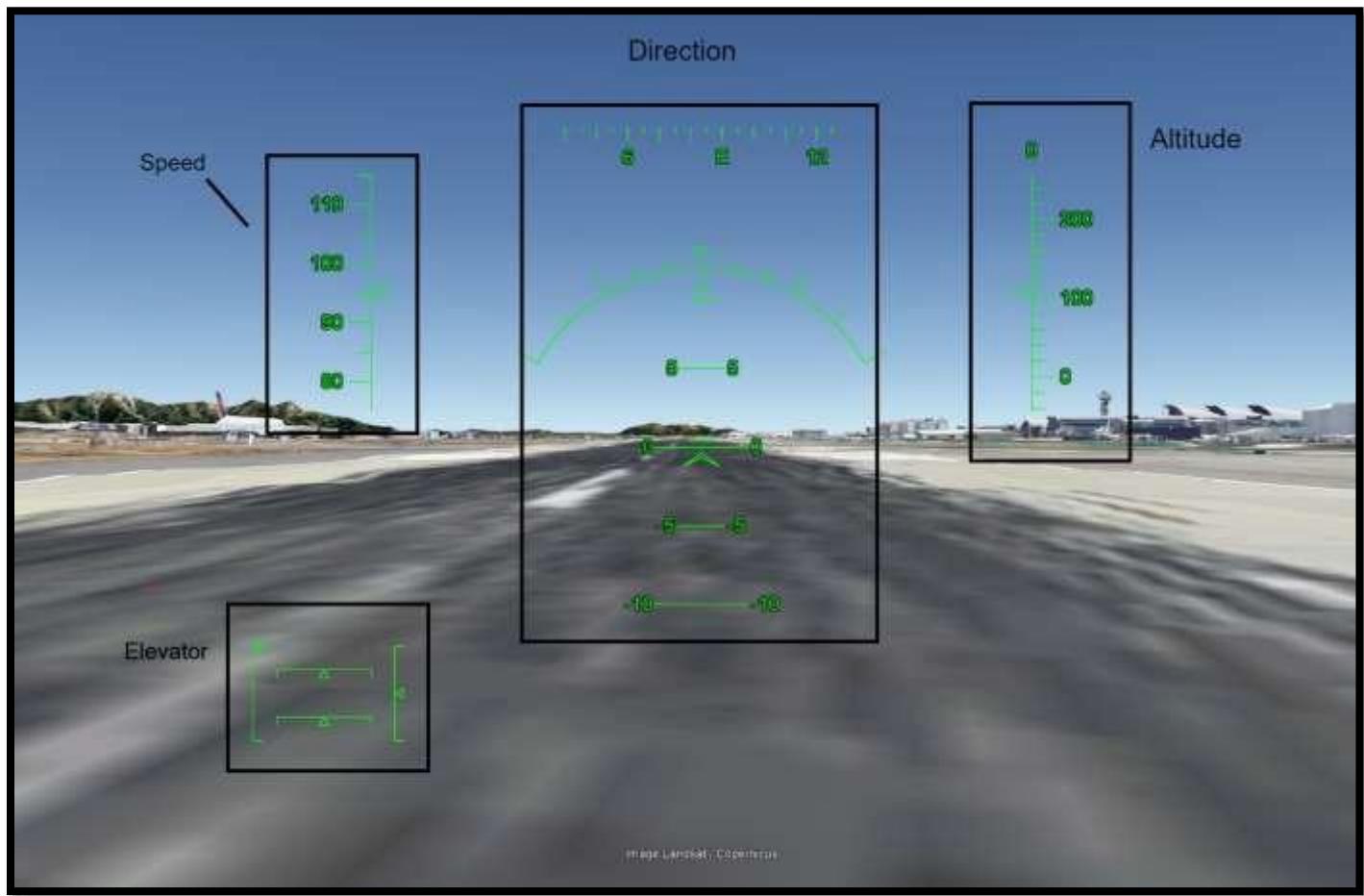


Figure 1.2

### **4. Flight Simulator Controls :**

- Learn the specific Flight Simulator controls, including how to control the aircraft's pitch, roll, yaw, throttle, and view angles. Practice using keyboard shortcuts, mouse, or a joystick for flight control.

1. For Thrust :- Page up Key
2. For Reduce Thrust :- Page down Key

3. To Move Left :- Comma Key
4. To Move Right :- Period Key [Dot]
5. To Move Upwards :- Up arrow Key
6. To Move Downwards :- Down arrow Key

## **5. Selecting Aircraft and Locations :**

- Explore the available aircraft models in the Flight Simulator and choose the one you want to fly. Decide on the locations you wish to simulate flights over, such as famous landmarks, cities, or natural wonders.
- Select any flight and Airport location.



Figure 1.3

## **6. Pre-Flight Checklist :**

- Before each flight, establish a pre-flight checklist to ensure all necessary settings are correctly configured, such as weather conditions, time of day, and flight parameters.

## **7. Flight Planning :**

- Plan your virtual flights in advance, specifying the departure and destination points, flight paths, and points of interest along the way.

## **• Advantages**

- 1. Realistic Experience :** Google Earth Pro Flight Simulator provides a realistic flying experience with accurate terrains, landscapes, and 3D models of buildings and landmarks.
- 2. Exploration :** The Flight Simulator allows users to explore the world from the skies, providing a unique perspective of famous landmarks, cities, and natural wonders.
- 3. Easy to Use :** The Flight Simulator features user-friendly controls, making it accessible to both beginners and experienced virtual pilots.
- 4. No Additional Cost :** Google Earth Pro's Flight Simulator is available for free to all users, without the need for additional purchases or subscriptions.
- 5. Learning Opportunity:** The Flight Simulator can be a valuable tool for learning basic flight principles and navigation skills.
- 6. Customization Options :** Users can customize flight settings, such as weather conditions and time of day, to tailor their flying experience according to their preferences.
- 7. High-Quality Graphics :** Google Earth Pro provides stunning visuals and high-quality graphics, enhancing the immersive experience of flying over different locations.

- **Disadvantages**

1. **Limited Realism** : While Google Earth Pro Flight Simulator offers a realistic experience, it may not match the level of detail and accuracy provided by dedicated flight simulation software.
2. **Limited Aircraft Selection** : The Flight Simulator in Google Earth Pro offers a limited selection of aircraft models, which may not satisfy users looking for a broader range of options.
3. **No Advanced Flight Features** : Advanced flight features, such as complex instrument panels, air traffic control, and system simulations, are not available in Google Earth Pro Flight Simulator.
4. **Dependence on Internet Connection** : Google Earth Pro requires an internet connection to access imagery and 3D models, which may limit the Simulator's usability in offline scenarios.
5. **Hardware Demands** : Running the Flight Simulator with high-quality graphics may demand significant hardware resources, potentially affecting performance on lower-end computers.
6. **Lack of Multiplayer Support** : Google Earth Pro Flight Simulator does not offer multiplayer support, limiting the possibility of flying with friends or other virtual pilots.

- **Applications**

1. **Virtual Aviation Enthusiasts** : The Flight Simulator in Google Earth Pro caters to aviation enthusiasts who enjoy the thrill of virtual flying and exploring various locations worldwide.
2. **Tourism and Travel Planning** : Tourists and travellers can use the Flight Simulator to get a preview of their destination's landscapes, landmarks, and scenic views before their actual trip.
3. **Educational Purposes** : The Flight Simulator can be utilized as an educational tool to introduce students to the basics of flight principles, navigation, and geography.

- 4. Geographic Research** : Researchers and geographers can use the Flight Simulator to study geographical features, landforms, and urban landscapes from a unique aerial perspective.
- 5. Urban Planning and Architecture** : Urban planners and architects can utilize the Flight Simulator to visualize urban layouts, buildings, and infrastructure projects in a 3D environment.
- 6. Location Scouting for Filmmakers** : Filmmakers and production teams can use the Flight Simulator to scout filming locations and assess the suitability of various landscapes for movie scenes.
- 7. Environmental Studies** : Researchers studying the impact of human activities on the environment can use the Flight Simulator to observe and analyse geographic changes.
- 8. Recreational Purposes** : Individuals seeking a recreational and stress-relieving activity can use the Flight Simulator for a virtual flying experience.
- 9. Flight Training Supplements** : As a starting point for beginners, the Flight Simulator can complement flight training programs by introducing basic flight controls and navigation.
- 10. Pilot Skill Enhancement** : Licensed pilots can use the Flight Simulator to practice flying procedures, flight routes, and emergency scenarios in a virtual environment.
- 11. Virtual Tourism and Promotion** : Travel agencies and tourism boards can create promotional content and virtual tours using the Flight Simulator to attract travellers to their destinations.
- 12. Disaster Simulation and Preparedness** : Emergency response teams can use the Flight Simulator for disaster simulations and preparedness training, allowing them to understand and visualize crisis scenarios.
- 13. Historical and Archaeological Studies** : Archaeologists and historians can use the Flight Simulator to explore ancient civilizations' landscapes and historical sites.

- **Improvements :**

1. **Expanded Aircraft Selection :** Adding more diverse and realistic aircraft models would provide users with a wider range of flying experiences and cater to different preferences.
2. **Advanced Flight Features :** Incorporating more advanced flight features, such as instrument panels, air traffic control, and realistic system simulations, would add depth and realism to the flight experience.
3. **Multiplayer Support :** Introducing multiplayer functionality would allow users to fly together, enabling collaborative flights or friendly competitions.
4. **Offline Mode :** Providing an offline mode option would allow users to access the Flight Simulator without relying on an internet connection, ensuring accessibility in remote locations.
5. **Real-Time Updates :** Regularly updating the Flight Simulator with real-time satellite imagery and 3D models would ensure that users have access to the latest information and visuals.
6. **Training Modules :** Incorporating dedicated training modules for aspiring pilots, including flight tutorials and interactive learning resources, would make the Flight Simulator a valuable educational tool.
7. **Customizable Controls :** Allowing users to customize control settings to match their preferences and input devices would enhance comfort and usability during flight.
8. **Enhanced Navigation Tools :** Introducing improved navigation aids, such as better GPS functionality and flight planning tools, would aid users in navigating to specific destinations more efficiently.

## **2.2**

### **High Definition Movie Export**

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- **Methodology:**

- **Requirements Analysis:**
- Conduct comprehensive market research to identify user demands and expectations for a high-definition movie export feature in Google Earth Pro.

- I. **Requirements:**

- **Google Earth Pro:** You need to have the Google Earth Pro application installed on your computer. Google Earth Pro is available for both Windows and macOS.

- **System Requirements:**

- ❖ **Windows OS:**

- Operating System: Windows 7 or later
- CPU: Intel Pentium 4 2.4 GHz+ or AMD 2400xp+ processor
- System Memory (RAM): 1 GB RAM
- Hard Disk Space: 2 GB available space
- Graphics Card: DirectX 9 or later with 64 MB of video RAM
- Network Speed: 768 Kbps (minimum) for streamed data

- ❖ **macOS:**

- Operating System: macOS 10.8 or later
- CPU: Intel-based Mac
- System Memory (RAM): 1 GB RAM
- Hard Disk Space: 2 GB available space
- Graphics Card: OpenGL 2.0 capable graphics card with 64 MB of video RAM
- Network Speed: 768 Kbps (minimum) for streamed data.

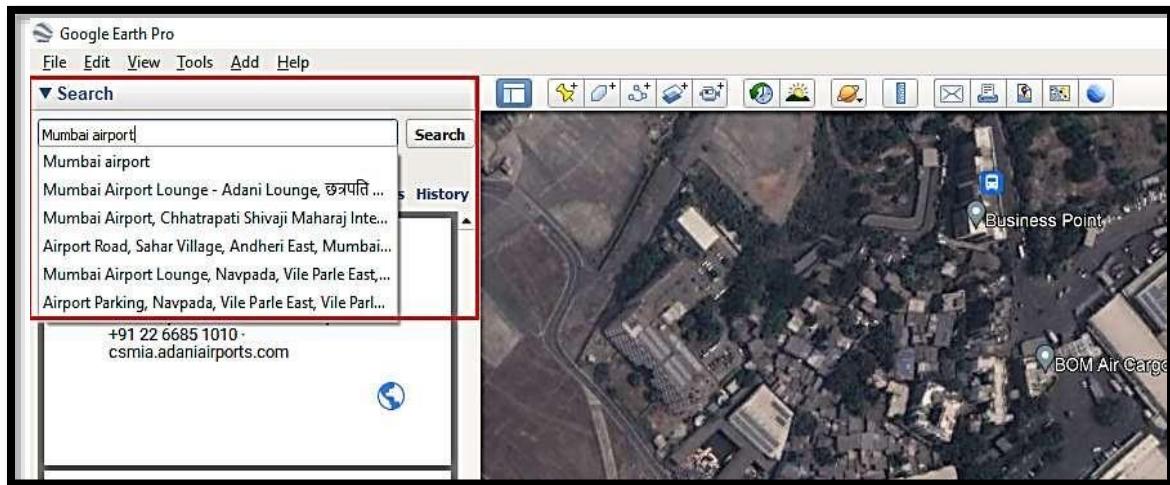
## **II. Accessing the Movie Export Tool:**

### **1. Launch Google Earth Pro:**

- ✓ Open the Google Earth Pro application on your computer.



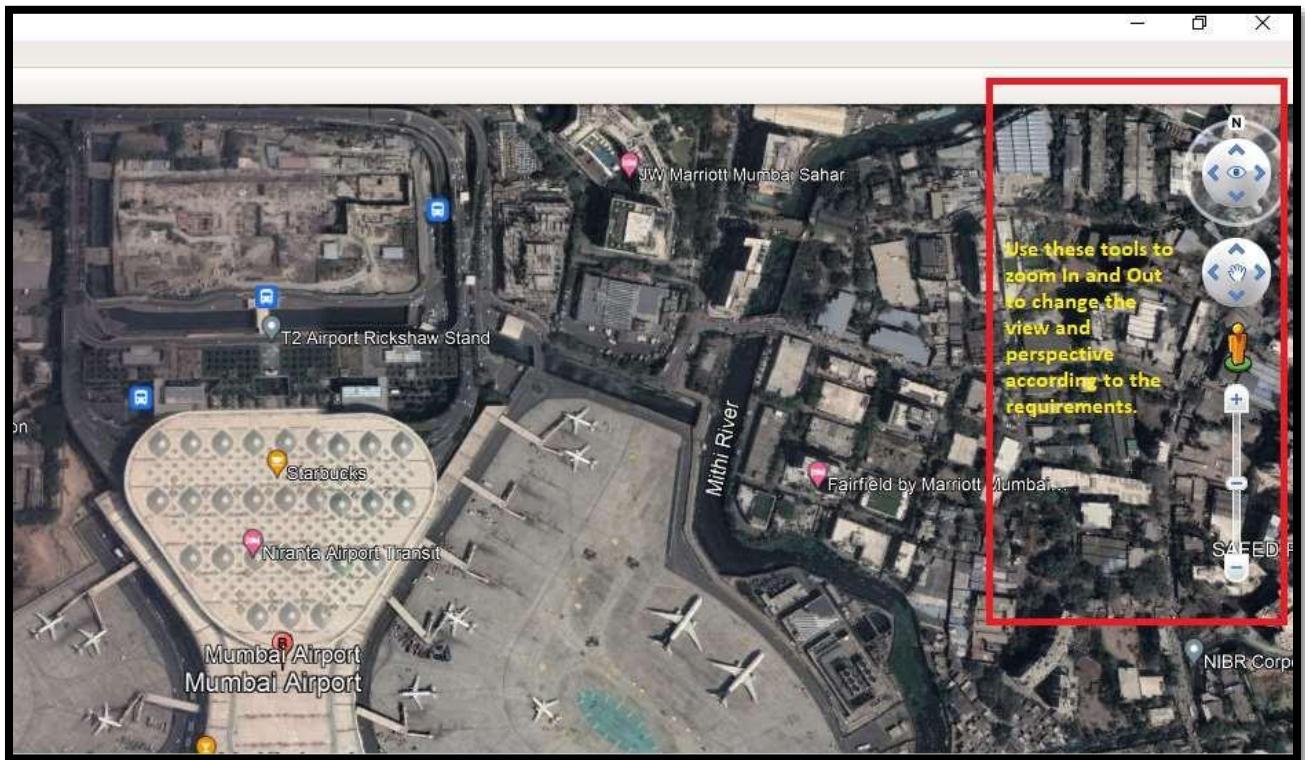
### **2. Navigate to the desired location:**



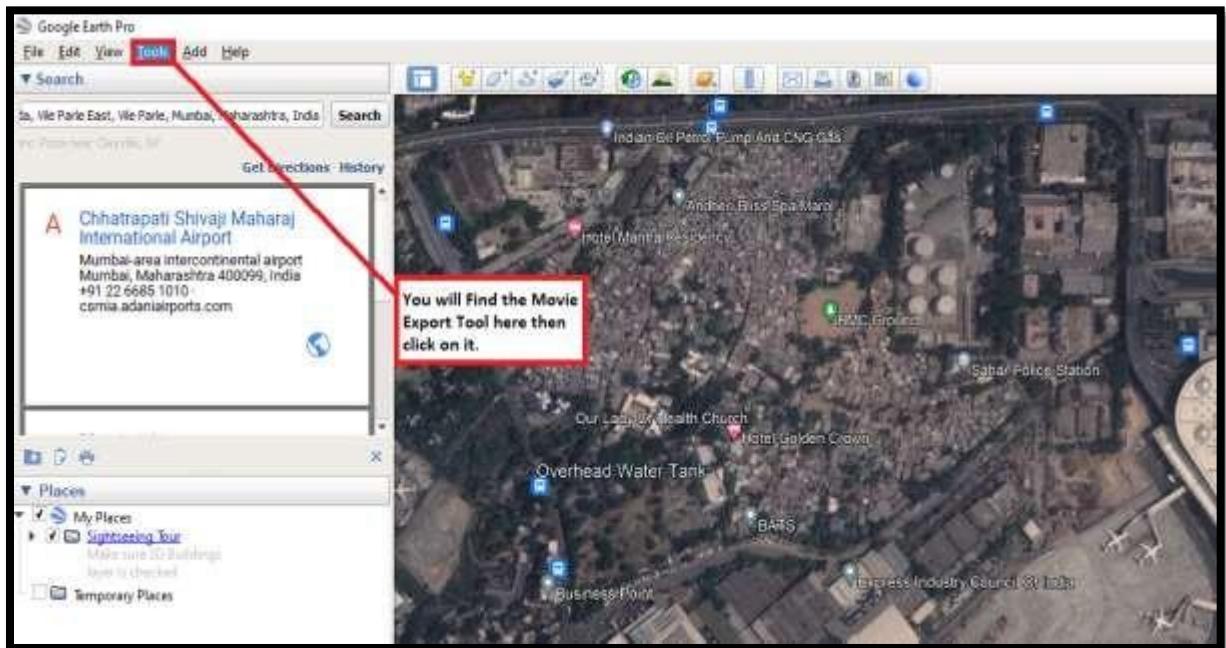
- ✓ Use the search bar, fly-to, or zoom controls to navigate to the location you want to capture in your movie.

### 3. Customize your view:

- ✓ Adjust the camera angle, tilt, and altitude to get the desired perspective for your movie.



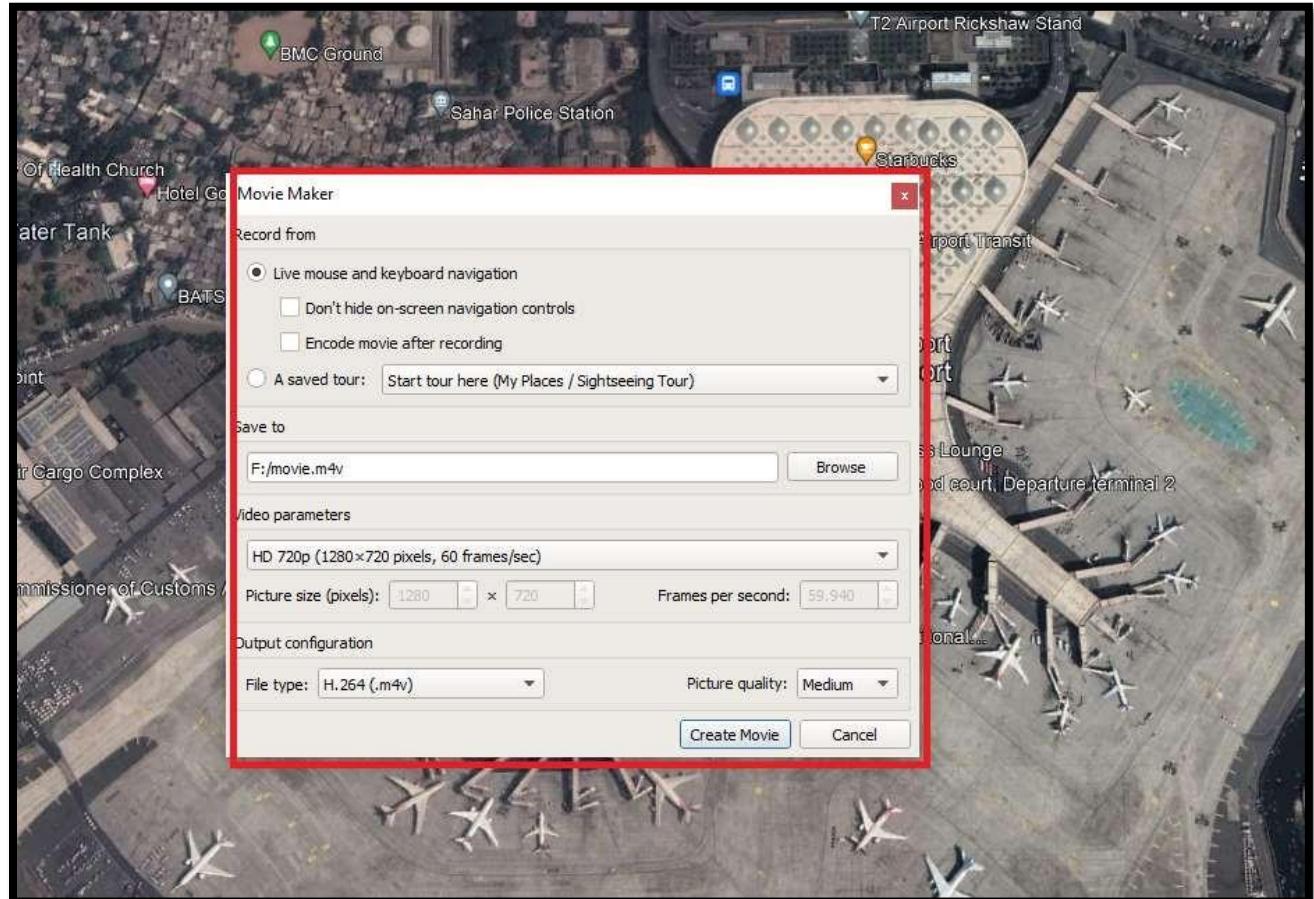
### 4. Find the Movie Export Tool:



- ✓ If a "Movie Export" tool is available, it should be located in the toolbar or menu options of Google Earth Pro. Look for options related to exporting or saving animations or movies.

## 5. Configure movie settings:

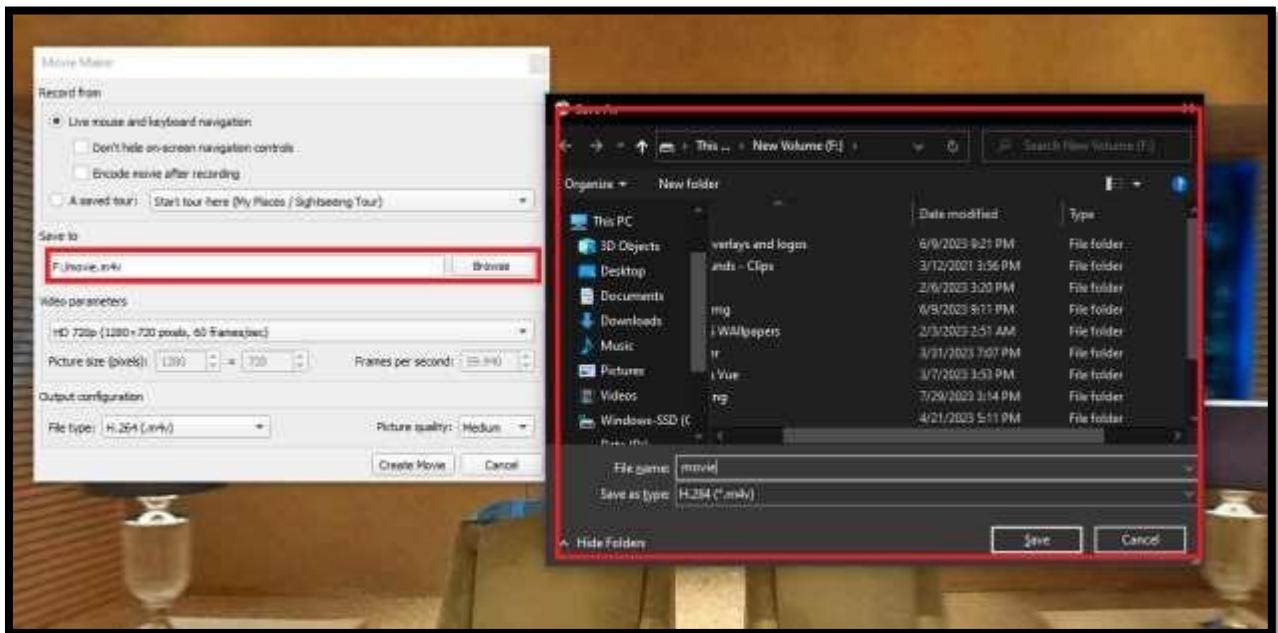
- ✓ If the tool is available, you might be able to configure various settings such as the resolution, frame rate, duration, and format of the movie.



- ✓ **Common parameters you might be able to adjust include:**
  - Resolution: Choose the output video resolution (e.g., 720p, 1080p, etc.).
  - Frame Rate: Set the number of frames per second (FPS) for the animation.
  - Duration: Specify the total length of the movie in seconds or minutes.
  - Format: Select the video format for the exported movie (e.g., MP4, AVI, etc.).
  - Quality: Adjust the video quality settings if applicable.

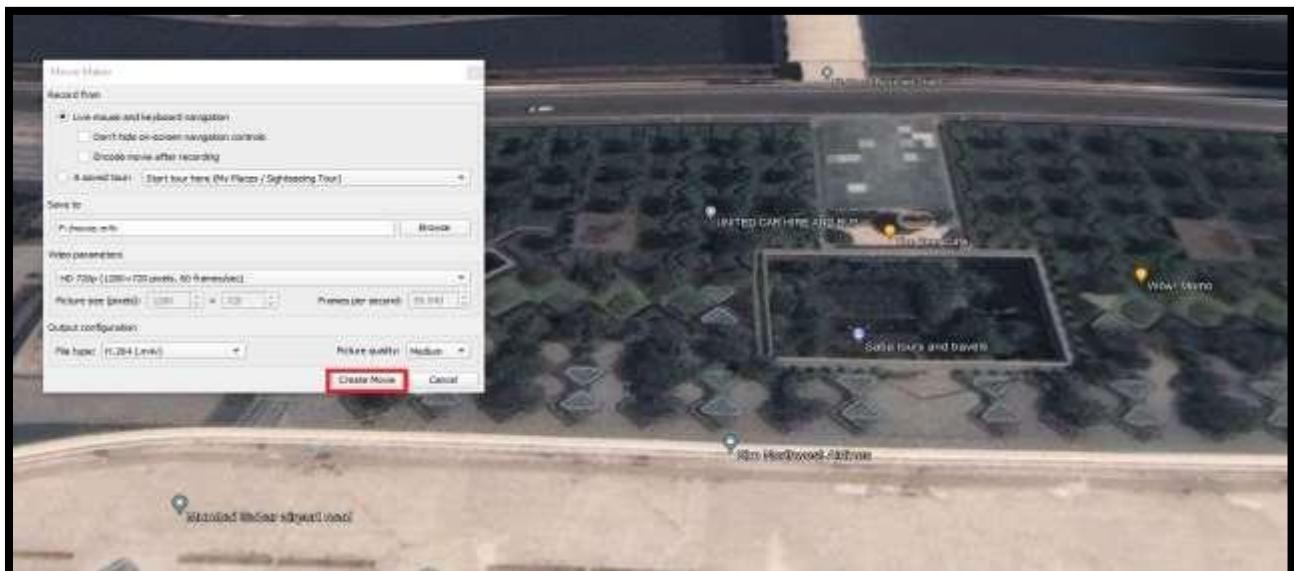
## 6. Save the exported movie:

- ✓ After that you will be given to save a location where your videos will get saved.



## 7. Start creating the Movie:

- ✓ Once you have set up the movie parameters, start the recording process. The tool will begin capturing the frames and saving them as a movie file on your computer.



### **III. Advantages:**

1. Creating Compelling Presentations: A movie maker tool would allow users to create dynamic and engaging presentations by animating the movement through locations and displaying various layers of data, such as satellite imagery, 3D buildings, terrain, and more.
2. Visual Storytelling: The ability to create movies can enhance visual storytelling. Users can showcase geographical journeys, historical events, environmental changes, or urban development over time.
3. Educational Use: Teachers, students, and researchers can utilize the movie maker to demonstrate geographic concepts, historical events, and scientific phenomena in an interactive and captivating manner.
4. Tourism and Travel Planning: The tool can be valuable for tourists and travelers to showcase their planned routes, highlight attractions, and share their travel experiences with others.
5. Marketing and Advertising: Businesses and organizations can use the movie maker to create promotional videos that showcase their location, services, or products in a visually appealing way.
6. Data Visualization: A movie maker can be used to present complex geographic data and trends over time, making it easier for viewers to comprehend the information.
7. Enhanced Communication: Movies are often more engaging than static images or text, making the movie maker a powerful tool for communicating ideas and concepts effectively.
8. Event Documentation: The movie maker can be used to record and share visual documentation of events, such as conferences, field trips, or environmental changes.
9. Personal Projects: Individuals can use the tool to create personalized movies of their travels, adventures, or explorations to share with friends and family.

10. Integration with Other Tools: If the movie maker tool is integrated with other features of Google Earth Pro, it can leverage the vast database of geographical information available in the application.

#### **IV. Disadvantages:**

1. Steep Learning Curve: Movie maker tools can be complex, and users may need time to learn how to use the tool effectively, especially if they are not familiar with video editing concepts.
2. System Requirements: Movie making and video rendering can be resource-intensive tasks, and users may require a powerful computer with sufficient processing power and memory to handle the movie creation process.
3. File Size and Storage: Movies, especially those with high resolution and long durations, can result in large file sizes. Users may need significant storage space to save their movies.
4. Export Time: Depending on the complexity of the movie and the user's hardware specifications, exporting the final movie may take a considerable amount of time.
5. Limited Customization: The movie maker tool in Google Earth Pro may have limitations on certain aspects of video customization, such as available video formats, frame rates, or video quality settings.
6. Dependency on Internet Connection: Some movie maker tools might require an internet connection for certain features, which can be inconvenient if users are working in areas with limited or no internet access.
7. Compatibility Issues: Users might encounter compatibility issues with specific video formats or codecs when exporting or sharing their movies with others.
8. Limited Availability: Depending on the version of Google Earth Pro or the user's subscription plan, the movie maker tool might not be available to all users.

9. Software Bugs and Glitches: Like any software, a movie maker tool can have bugs or glitches that may affect the user experience or the final output.
  
10. Need for Frequent Updates: If Google Earth Pro releases updates or new versions, users may need to ensure that the movie maker tool is compatible with the latest version of the software.

## V. **Application:**

1. Visual Presentations: Users can create dynamic and visually appealing presentations using the movie maker to showcase geographical locations, historical events, environmental changes, and more.
  
2. Educational Tool: Teachers, students, and researchers can use the movie maker to explain geographic concepts, historical developments, and scientific phenomena through interactive and animated videos.
  
3. Tourism Promotion: The movie maker can be utilized by tourism boards, travel agencies, or individuals to create promotional videos highlighting tourist destinations and attractions.
  
4. Environmental Studies: Researchers and environmentalists can use the tool to document changes in landscapes, vegetation, and wildlife over time, helping in environmental impact assessments.
  
5. Urban Planning: City planners and architects can demonstrate proposed urban development projects and visualize how cities might evolve in the future.
  
6. Marketing and Advertising: Businesses can leverage the movie maker to create engaging videos to promote their services or products, especially if location-based marketing is relevant.
  
7. Data Visualization: Complex geographic data and trends can be better understood when presented through animated videos, aiding in decision-making processes.

8. Event Documentation: The movie maker can be used to record and share visual documentation of events, such as conferences, workshops, or community gatherings.
9. Personal Projects: Individuals can use the movie maker to create personalized videos of their travels, adventures, or exploration, preserving memories in an engaging format.
10. Social Media Content: The tool can help users create eye-catching content for social media platforms to share geographic discoveries or travel experiences.
11. Business Proposals: Professionals in various fields can enhance their business proposals by including dynamic visualizations of geographic data and project plans.
12. Historical Reconstructions: The movie maker can be utilized to recreate historical events or scenarios based on geographical data and historical records.

## VI. **Improvements:**

1. User Interface Enhancements: Improving the user interface to make it more intuitive and user-friendly can help users quickly grasp the movie maker's functionalities and streamline the movie creation process.
2. More Customization Options: Adding more options for customization, such as advanced video settings, transitions, and effects, would allow users to create more professional-looking movies tailored to their specific needs.
3. Enhanced Camera Controls: Offering more advanced camera controls, including keyframing for smooth camera movements and control over camera paths, can provide users with greater creative freedom.

4. Integrated Timeline Editor: A timeline editor within the movie maker interface would enable users to precisely control the timing and duration of animations, transitions, and other elements in the movie.
5. Expanded Library of Assets: Providing access to a broader range of 3D models, textures, and icons can enhance the visual quality of movies and enable users to better represent their geographical concepts.
6. Audio Integration: Allowing users to add background music, narration, or sound effects to their movies can enhance storytelling and engagement.
7. Geospatial Data Animation: Enabling users to animate changes in geospatial data over time, such as satellite imagery, climate data, or population trends, can be a powerful feature for data visualization and analysis.
8. Export Formats and Resolutions: Offering support for various video export formats and resolutions, including higher resolutions like 4K, can accommodate users with diverse needs.
9. Cloud-Based Storage and Collaboration: Introducing cloud storage for movie projects and collaboration features could enable users to access their projects from multiple devices and collaborate with others in real-time.
10. Advanced Rendering and Performance Optimization: Optimizing the rendering process to reduce export times and resource usage, especially for complex movies, would improve the overall user experience.
11. Tutorials and Help Resources: Providing comprehensive tutorials, guides, and tooltips within the movie maker interface can assist users in learning the tool's features and making the most of its capabilities.
12. Presets and Templates: Including preset movie styles or templates for common use cases, such as travel, education, or marketing, can help users get started quickly and achieve professional results.

## **2.3**

**Street View For Any Location With Coverage**

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## I. Google Maps Street view :-

### 1. Accessing Street view :

- Launch Google maps on your browser. To access the Street view, Select or point location that you want to see.
- Step 1:- Click on Street view to see street view.

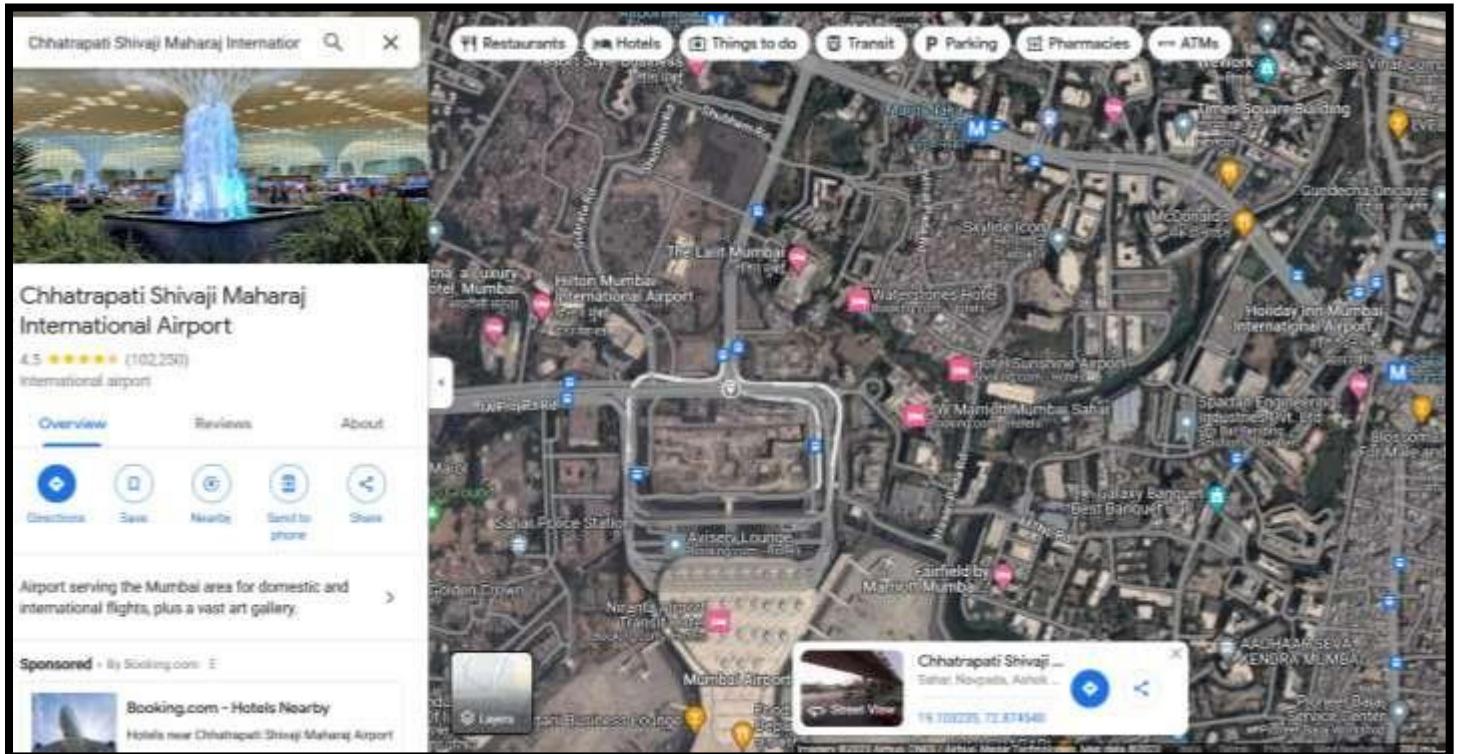


Figure 1.1

### 2. System Requirements :

- Ensure that your computer meets the system requirements for running Google street view. software prerequisites :-
  1. **Browser**:- like chrome,firefox,edge etc
  2. **Internet Connection** :- A stable internet connection is required to access Google Earth Pro and load high-resolution imagery and 3D models.

### 3. Acquiring Navigation Skills :

- Familiarize yourself with the navigation controls in Google Maps, such as zooming, Navigate, and rotating the view. Understanding these controls is essential for effective manoeuvring during the Flight Simulator experience.



Figure 1.2

#### 4. Street view Navigation Controls :

- Click and Drag: On a computer, click and drag the screen to change the viewpoint. On mobile, swipe with your finger in the direction you want to look.
- On-Screen Arrows: In Street View, there are white arrows superimposed on the roads and paths. Click on these arrows to move in the direction they point. On mobile, tap the arrows.
- Navigation Controls (Mobile): On mobile, you will have on-screen navigation controls that allow you to move forward, backward, and turn left or right.

## ● **Advantages**

1. **Visual Exploration:** Street View provides a realistic and immersive visual representation of various locations, allowing users to virtually explore places they have never been to or plan to visit.
2. **Familiarization:** Street View helps users become familiar with unfamiliar areas before visiting in person. This can be particularly useful for travelers, tourists, and people relocating to new places.
3. **Real-Time Conditions:** Street View images are updated regularly, allowing users to view locations as they currently appear, including recent changes and developments.
4. **Route Planning:** Street View assists in planning routes and navigating through unfamiliar areas. By using Street View along with turn-by-turn directions, users can have a better understanding of what to expect during their journey.
5. **Research and Education:** Street View has educational applications, enabling students and researchers to examine geographical features, urban development, historical landmarks, and more, all from the comfort of their computers or mobile devices.
6. **Safety and Security:** Street View can be used to assess safety and security concerns in a neighborhood or location. Users can examine the area before visiting to make informed decisions about their safety.
7. **Accessibility:** Street View benefits people with mobility challenges by enabling them to virtually visit places that may be difficult to access in person.

## ● **Disadvantages**

1. **Privacy Concerns:** One of the most significant concerns surrounding Street View is privacy. Since the images captured often include people, license plates, and private properties, there are privacy issues related to the publication of such data without explicit consent.
2. **Limited Coverage:** While Google Maps Street View is continually expanding its coverage, it is still not available in all locations around the world. Some rural areas, remote regions, and private properties may not be accessible through Street View.
3. **Outdated Imagery:** Street View images are not updated in real-time, and there may be a significant time lag between image captures and their availability on Google Maps. This means that the images might not reflect recent changes or developments in a particular location.
4. **Navigation Challenges:** Street View can be less practical for navigation in complex environments, such as dense urban areas with many small streets, alleys, or areas with poor GPS signal reception.

5. **Visual Quality:** In certain areas, the image quality in Street View may be less than optimal, leading to blurry or distorted images, which can limit the overall experience.
6. **Limited Indoor Coverage:** While Street View offers outdoor views of various locations, its coverage of indoor spaces is relatively limited. Indoor views are often available only for specific public places like museums, restaurants, or businesses that have participated in Google's Indoor Street View program.
7. **Resource Intensive:** Using Street View requires an internet connection and a device capable of handling the data-intensive visual content. It can be challenging for users with slow internet connections or older devices to access Street View seamlessly.
8. **Misinterpretation of Information:** Sometimes, Street View images can lead to misunderstandings or incorrect assumptions, as the context and spatial relationships in the images may not be entirely clear.

- **Applications**

1. **Travel and Tourism:** Street View is a valuable tool for travelers and tourists to explore destinations virtually before planning their trips. It helps them get a sense of what to expect, the layout of the area, and nearby points of interest.
2. **Real Estate:** In the real estate industry, Street View is used to provide potential buyers and renters with a virtual tour of properties and neighborhoods. It allows them to assess the surroundings and make more informed decisions about the properties they are interested in.
3. **Urban Planning and Architecture:** Urban planners and architects use Street View to analyze existing urban environments and assess the suitability of locations for new developments. It aids in understanding the existing infrastructure, building styles, and cityscape.
4. **Education and Research:** Street View has educational applications, enabling students and researchers to study geographical features, urban development, historical landmarks, and more. It serves as a virtual tool for exploring the world from the classroom or research lab.
5. **Business Listings:** Businesses can use Street View to enhance their online presence by adding their storefronts or interiors to Google Maps. This feature helps potential customers get a virtual tour of the business before visiting in person.
6. **Historical Documentation:** Street View serves as a historical record, capturing images of various locations at different points in time. This can be valuable for documenting changes in urban landscapes and landmarks over the years.

7. **Accessibility:** People with mobility challenges can virtually visit places through Street View that might be difficult for them to access physically. This can help enhance inclusivity and equal access to information.
8. **Emergency Planning:** Street View assists emergency responders in familiarizing themselves with the layout of an area before arriving at the scene. This can be particularly helpful in time-sensitive situations.
9. **Environmental Conservation:** Researchers and conservationists can use Street View to study and monitor natural habitats and wildlife without disturbing the ecosystem.

## ● **Improvements**

1. **Expanded Coverage:** While Google Maps Street View covers many areas worldwide, there are still gaps in coverage, especially in remote or less densely populated regions. Continued efforts to expand coverage to more locations would benefit users globally.
2. **Real-Time Updates:** Providing more frequent updates to Street View imagery would ensure that users have access to the most current and accurate visual representations of locations.
3. **Better Image Quality:** Improving the image quality in Street View, especially in areas with lower resolution or distorted images, would enhance the user experience.
4. **Improved Navigation:** Enhancing the navigation interface and options in Street View would make it easier for users to move around and explore locations more smoothly.
5. **User-Generated Content:** Allowing users to contribute and upload their Street View images of specific places (within certain guidelines) could help expand coverage and keep imagery more up-to-date.
6. **Accessibility Features:** Implementing accessibility features to make Street View more usable for people with disabilities would enhance inclusivity.
7. **Offline Availability:** Enabling users to save Street View images or areas for offline access would be beneficial, especially in areas with limited internet connectivity.
8. **360-Degree Videos:** Integrating 360-degree videos into Street View could provide a more dynamic and immersive experience for users.
9. **Integration with AR/VR:** Leveraging augmented reality (AR) and virtual reality (VR) technologies could offer new ways for users to interact with Street View and make it even more engaging.

## **2.4**

### **Historical Imagery View**

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**1. Install Google Earth Pro:** If you haven't already, download and install Google Earth Pro on your computer. It is available for both Windows and Mac operating systems.

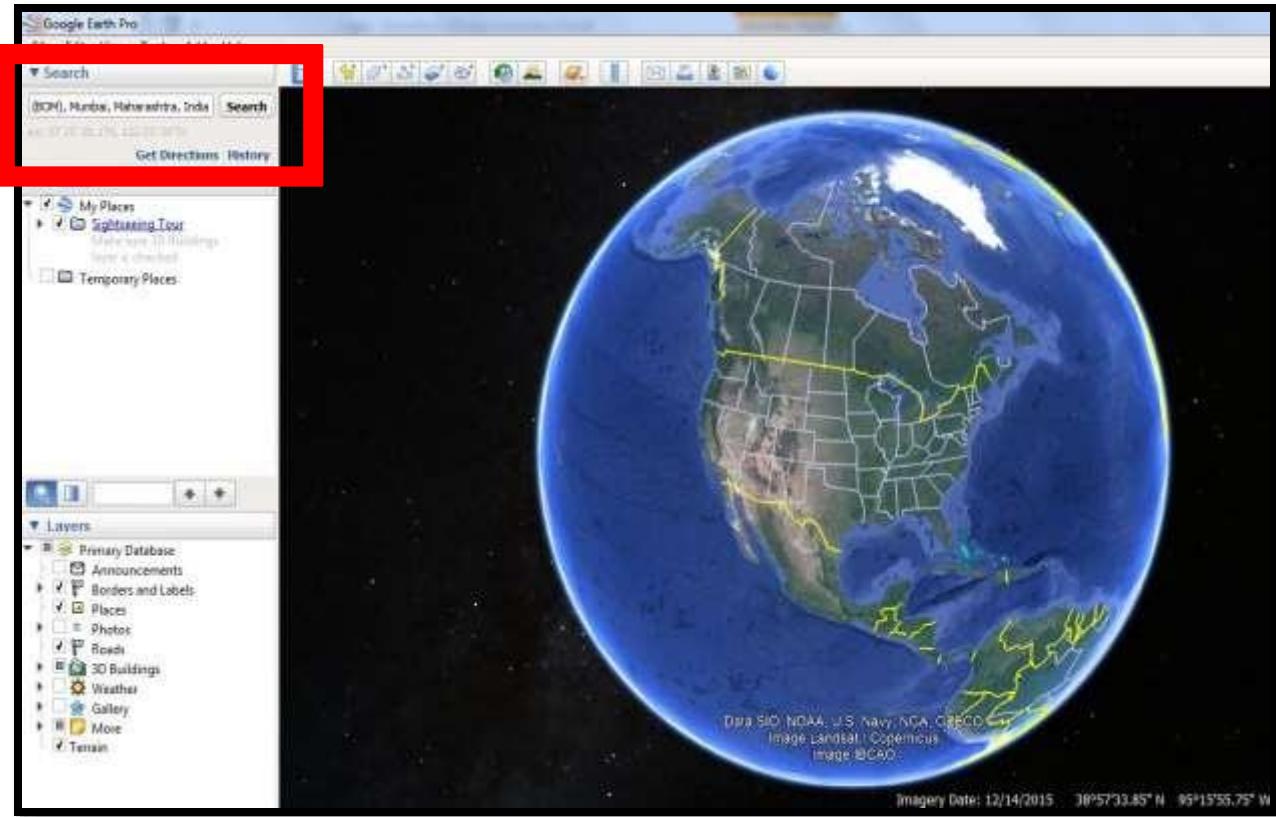
2.



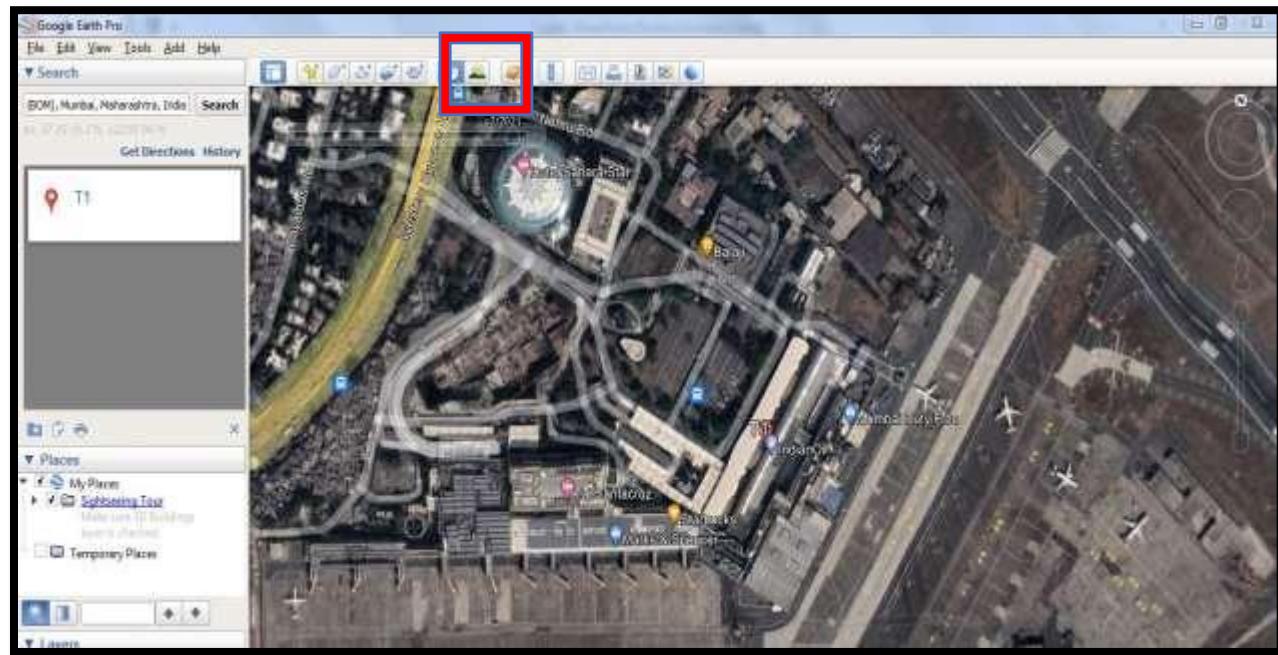
**3. Launch Google Earth Pro:** Open the Google Earth Pro application on your computer.



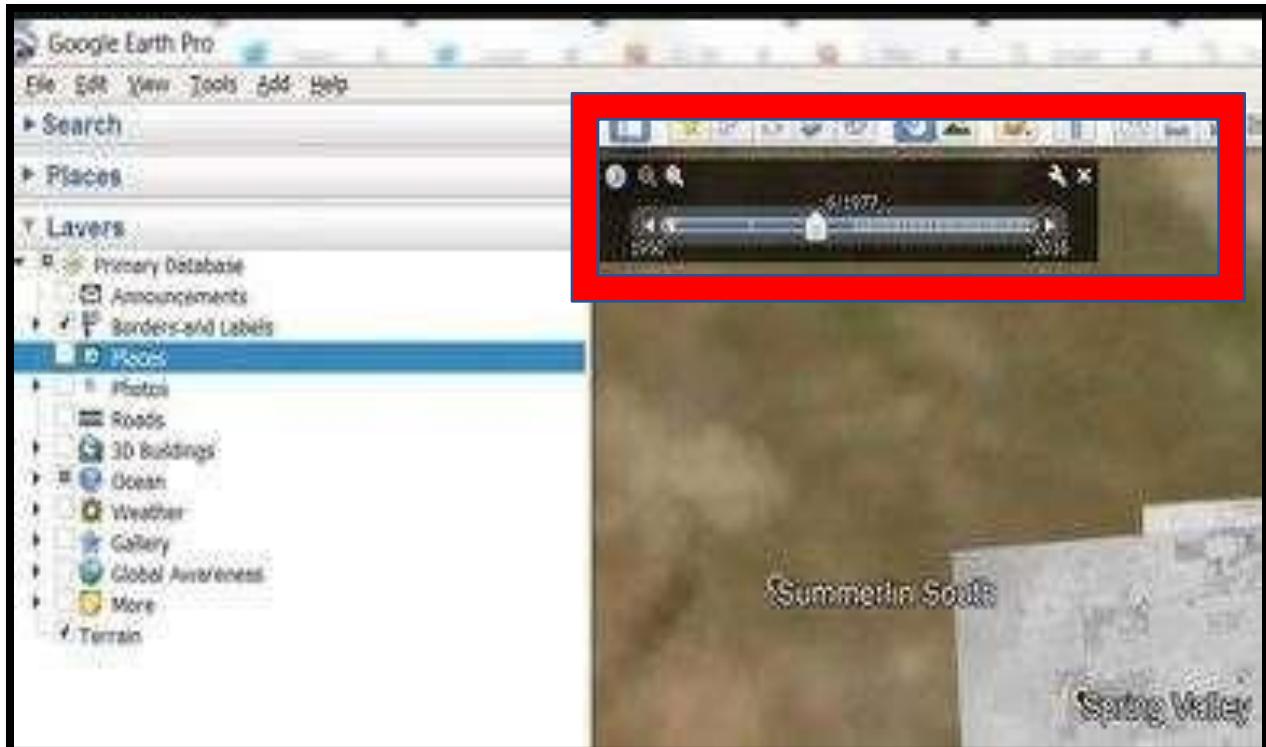
4. **Navigate to the Desired Location:** Use the search bar or the navigation tools to find the location for which you want to view historical imagery.



5. **Check for Historical Imagery:** Once you have located the desired area, zoom in to a specific location. If historical imagery is available for that location, you will see a clock icon in the top menu bar.

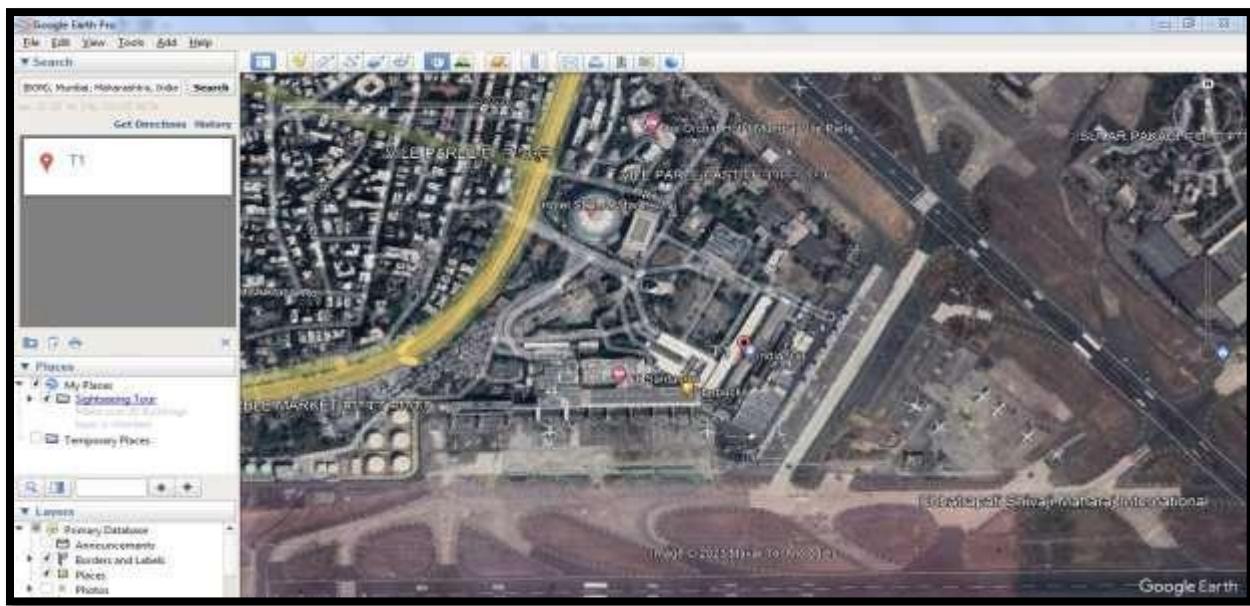


6. **Enable Historical Imagery:** Click on the clock icon to enter "Historical Imagery" mode. This will open a timeline slider at the top of the 3D view.

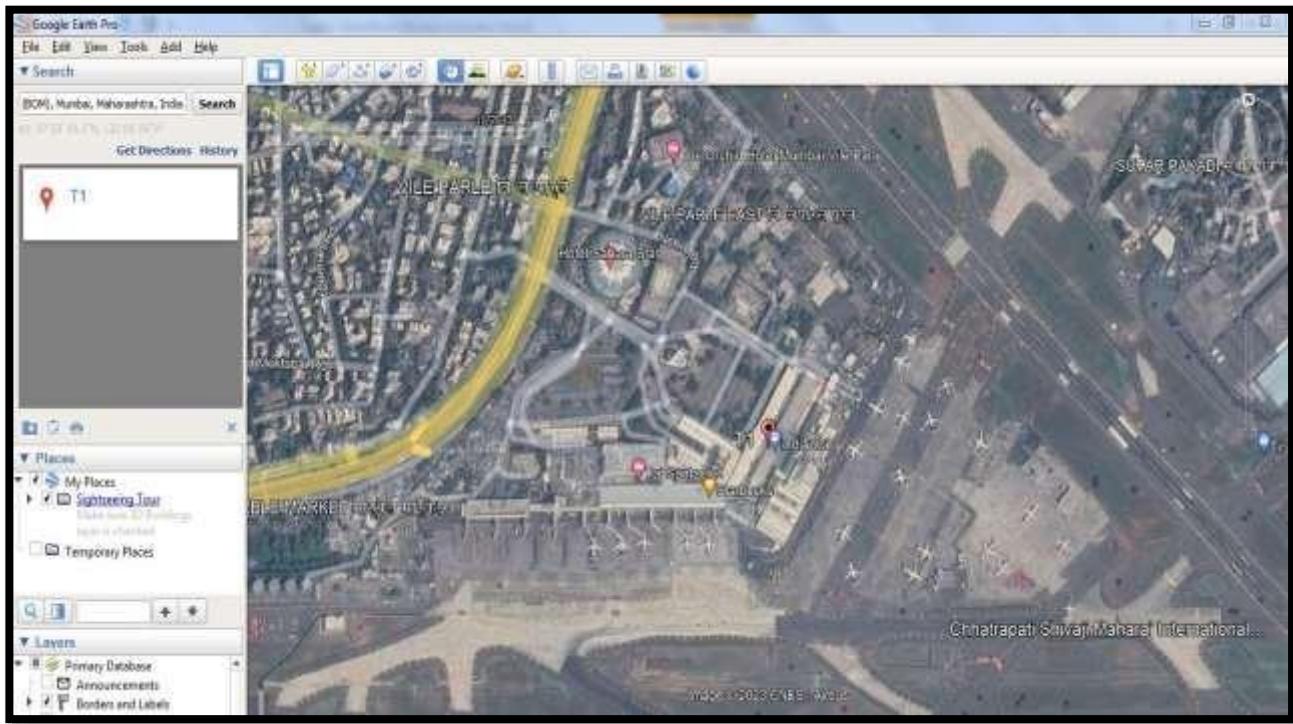


7. **Explore Historical Imagery:** Drag the timeline slider to the left or right to browse through the available historical imagery for that location. The dates for which imagery is available will be displayed on the slider.

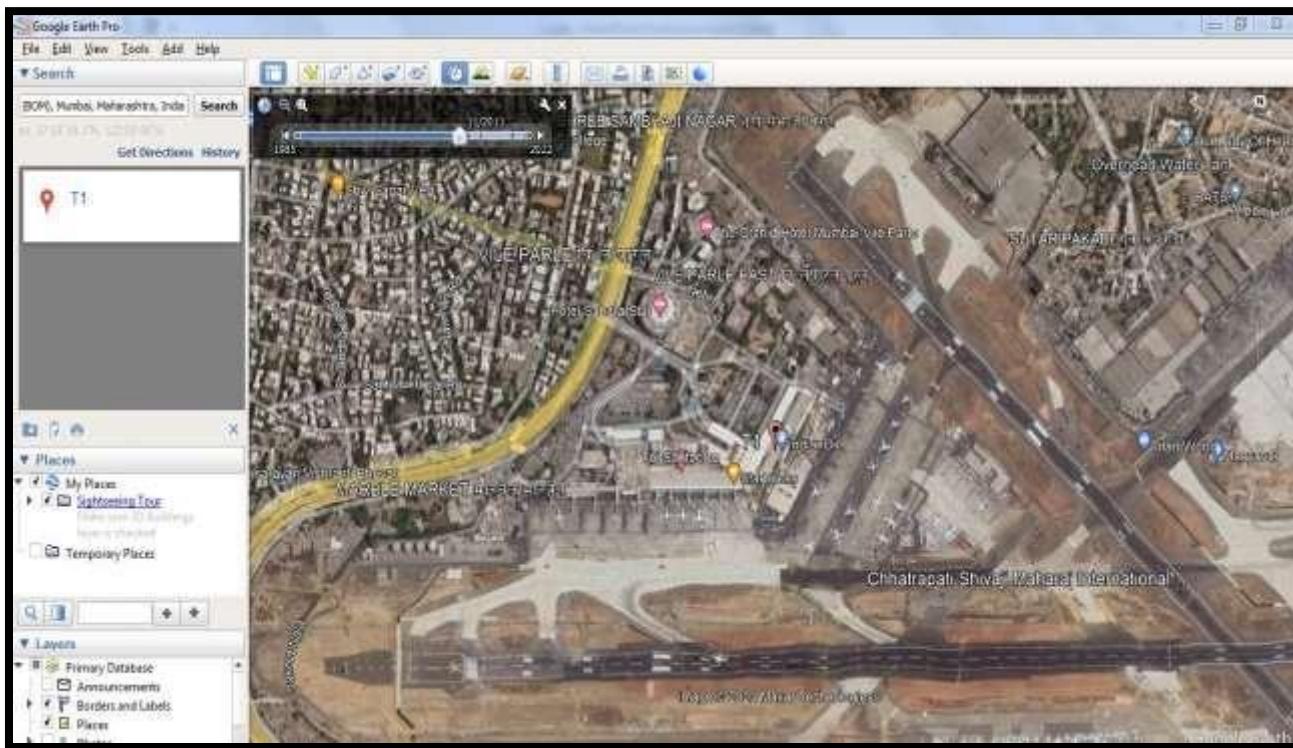
- present view:



- past view:



8. **View Historical Images:** As you move the timeline, the imagery will change to reflect the satellite images from the selected date. You can compare different time periods to observe changes in the area over time.
- Historical Image view in 2011



9. **Exit Historical Imagery Mode:** To exit the Historical Imagery mode, simply click on the "Exit Historical Imagery" button located at the bottom of the timeline slider, or click on the clock icon again.

- **Advantages of Historical Image view:**

- **Visualizing Change Over Time:** One of the main advantages of Historical Image view is the ability to visualize and compare changes that have occurred in a location over time. Users can observe how landscapes, urban areas, natural features, and human-made structures have evolved or transformed.
- **Historical Research and Documentation:** Historical Image view provides researchers, historians, and archaeologists with a valuable tool to study and document historical sites and landscapes. It can be used to analyze the development of cities, changes in land use, and the impact of events or disasters on a particular area.
- **Educational Purposes:** For educational purposes, Historical Image view can be highly beneficial. It enables teachers and students to explore and understand historical events, environmental changes, and the impact of human activities on the planet's surface.
- **Environmental Studies:** Environmentalists and scientists can use the historical imagery to study the effects of climate change, deforestation, urbanization, and other environmental phenomena on various regions over time.
- **Urban Planning and Development:** City planners and urban developers can use historical imagery to analyze how cities have expanded and developed over time. This information can aid in making informed decisions about future development projects.

- **Disadvantages of Historical Image view:**

- **Limited Time Range:** Historical Image view may not provide images dating back to ancient or pre-satellite eras. The availability of historical imagery is typically limited to the time period since the advent of satellite technology, which may not cover events or changes from centuries or millennia ago.
- **Inconsistent Image Quality:** The quality and resolution of historical imagery can vary significantly depending on the time period and location. Some older images may be grainy or less detailed, making it difficult to analyze certain features accurately.
- **Complexity in Data Management:** Managing and organizing large volumes of historical imagery data can be complex and resource-intensive, both for Google Earth Pro and the data providers.
- **No Real-Time Updates:** Since it does not provide real-time information about ongoing events or recent changes in a location.

- **Application of Historical Image view:**

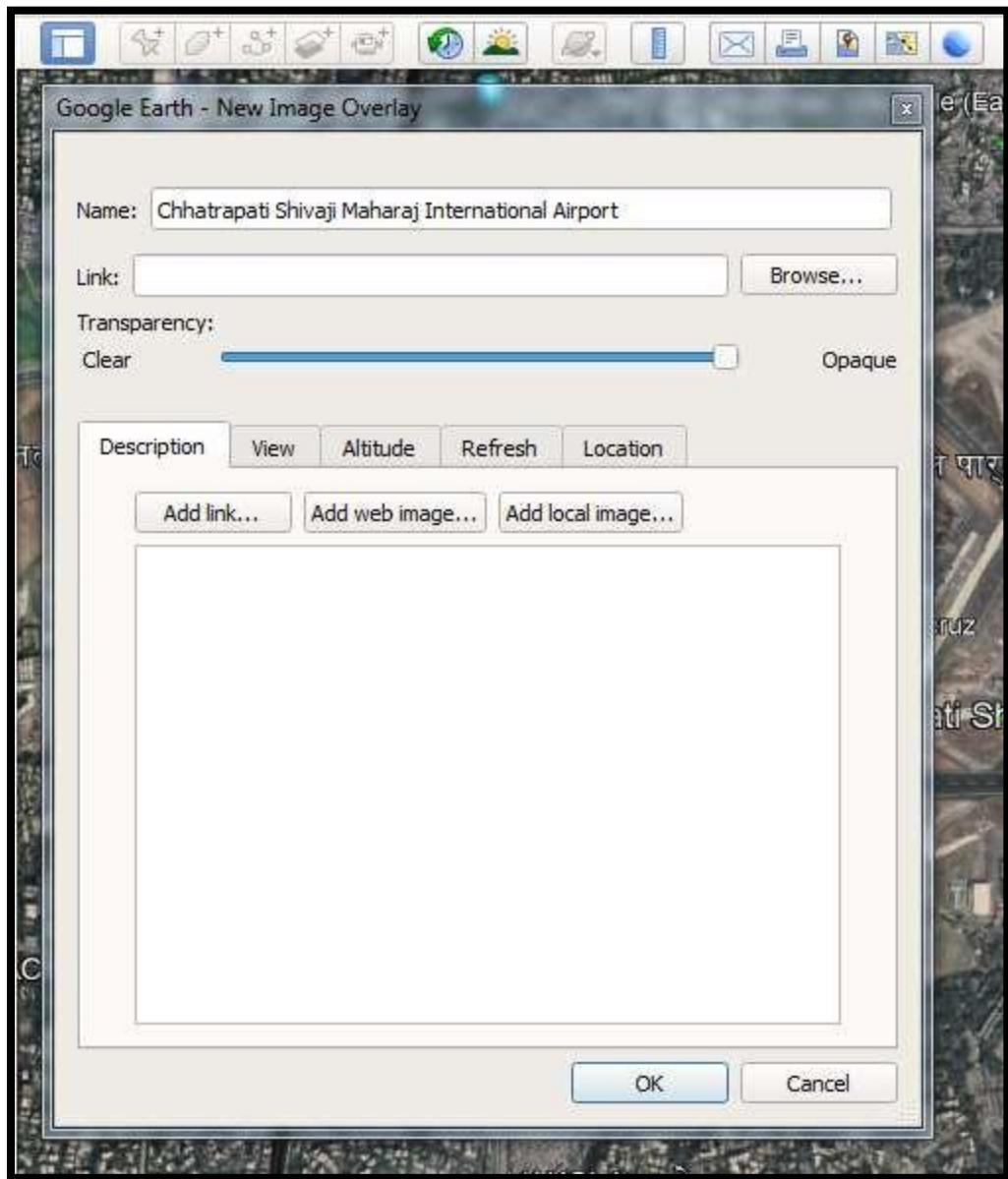
- **Urban Planning and Development:** City planners and urban developers can use historical imagery to analyze the growth and changes in urban areas over time. It helps in understanding how cities have evolved, identifying trends, and making informed decisions about future development projects.
- **Environmental Studies:** Environmentalists and researchers can study historical imagery to observe changes in ecosystems, land use, deforestation, and urban sprawl. It aids in assessing the impact of human activities on the environment and planning conservation efforts.
- **Historical Research and Education:** Historians, educators, and students can utilize historical imagery to study past events, visualize historical landscapes, and enhance the understanding of historical contexts.
- **Infrastructure Monitoring and Maintenance:** Engineers and infrastructure managers can monitor the condition of critical infrastructure like roads, bridges, and buildings by comparing historical images with current ones.
- **Educational Projects and Presentations:** Historical imagery can be integrated into educational projects and presentations to provide visual context and enhance the learning experience.
- **Media and Entertainment:** Filmmakers, documentary producers, and writers can use historical imagery to recreate historical settings and accurately depict events in films, TV shows, and literature.
- **Monitoring Land Use Changes:** Land management authorities can use historical imagery to monitor and enforce land-use regulations and identify unauthorized changes to the landscape.

**2.5**

## **Customized Map Overlays**

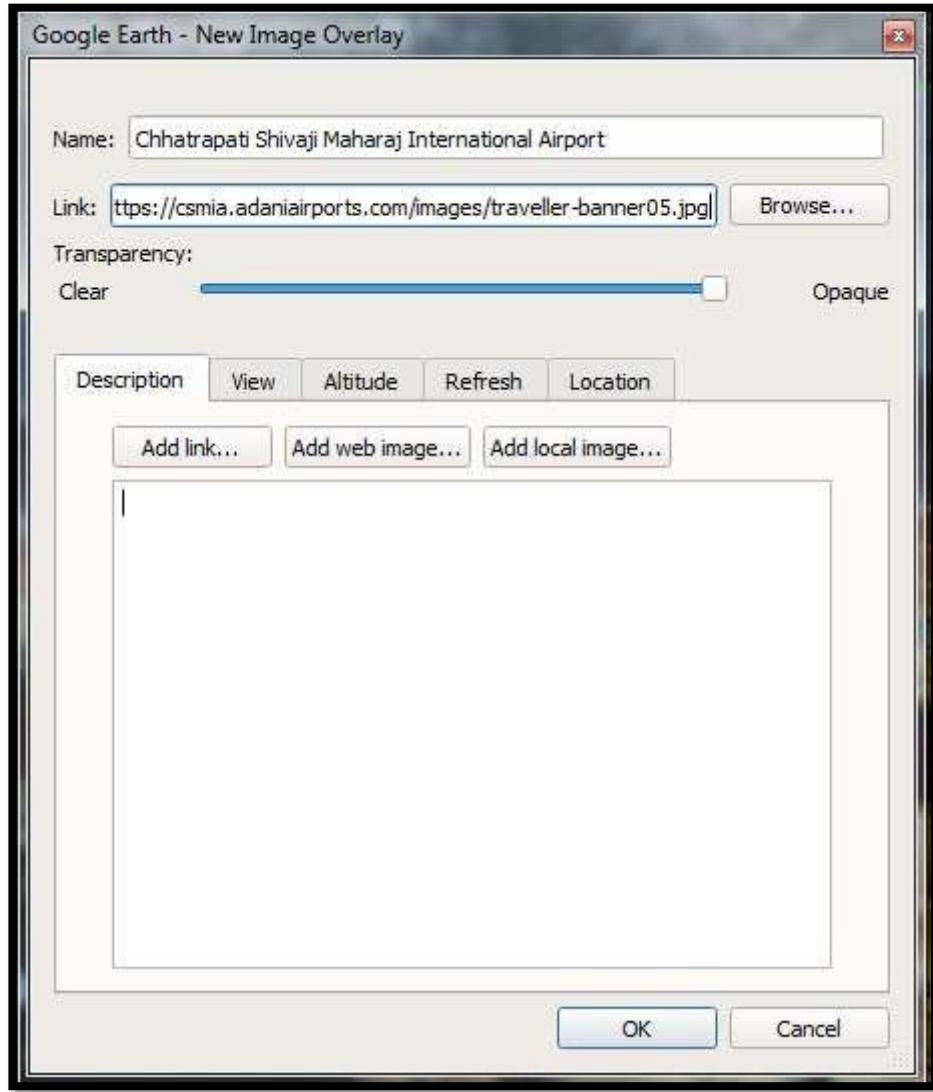
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1. Click the *Add Image Overlay* button  to add a new image overlay. A *New Image Overlay* dialog box appears, and a green outline is placed on the Earth.
2. In the *New Image Overlay* dialog box, type in a name for the image overlay in the **Name** field.

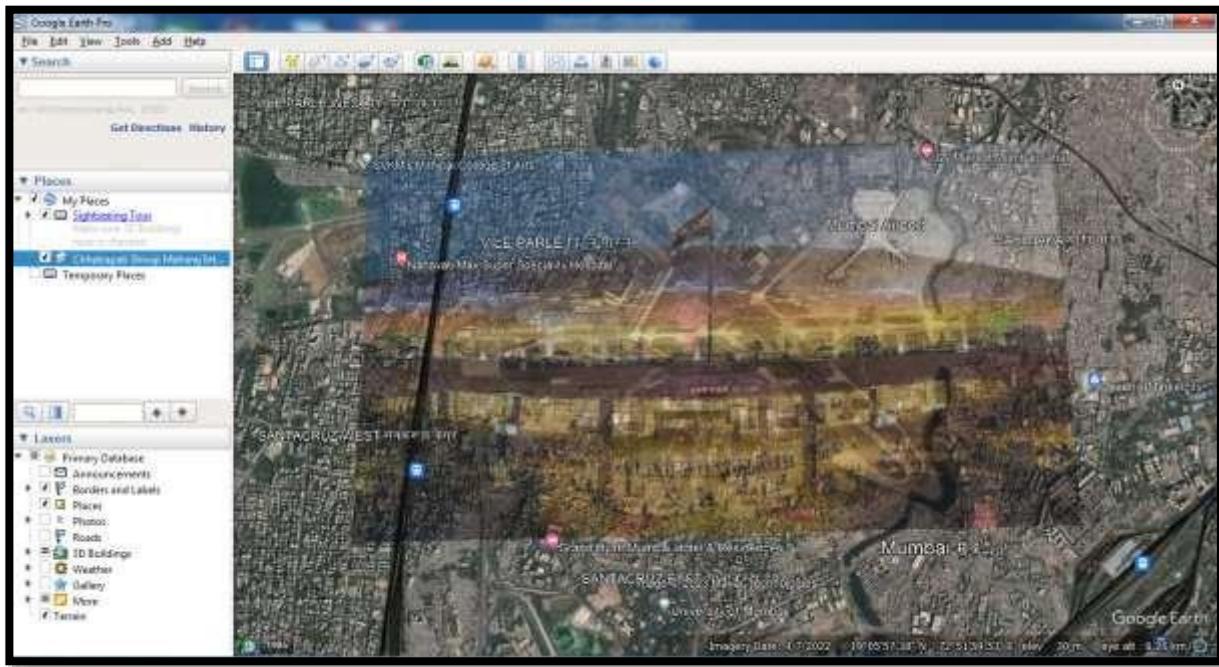


3. Copy and paste the link below into the Link field, or click "Browse..." and find an image to add from your local hard drive. In this example, we will use the following URL from the Internet:

<https://csmia.adaniairports.com/images/traveller-banner05.jpg>



4. Move the Transparency slider to the left to make the image a little transparent, which will assist you in placing the image in the correct location. Use the park boundaries to help you align the park boundaries on the map with the boundaries in Google Earth.
5. Use the center crosshair marker to move the image overlay on the globe and position it in the right location.
6. Use the triangle marker at the left to rotate the image for better placement.
7. Use any of the corner or side anchors to stretch or skew the selected corner or side. If you press the Shift key when selecting this marker, the image is scaled from the center.



8. Click OK when you are finished. The map is now listed in the Places panel, and can be saved to a KML file with other Google Earth project data you have created.

- **Advantages:**

- Personalization: Customizing map overlays allows users to add their own data, annotations, and graphics to the map, making it relevant and personalized to their specific needs and interests.
- Data Visualization: Users can overlay various types of data, such as demographic information, land use patterns, or geological data, onto the map, providing a visually rich representation of information and facilitating data analysis.
- Decision Making: Customized overlays can assist in decision-making processes for businesses, researchers, and individuals, as they can visually analyze and interpret data in the context of geographic locations.
- Communication: Overlaying custom data and graphics on the map enables users to communicate complex information effectively and share their findings with others, fostering collaboration and understanding.
- Project Planning: Custom overlays can be used for project planning, such as real estate development, infrastructure projects, or environmental assessments, helping stakeholders visualize the impact and potential outcomes.
- Educational Tool: For educational purposes, customized overlays can enhance lessons by visually presenting geographical information and making learning more engaging and interactive.

- **Tourism and Marketing:** Businesses in the tourism and marketing industries can use custom overlays to highlight key attractions, events, or services in a specific area, attracting potential customers and enhancing their marketing efforts.

- **Disadvantages:**

- **Data Accuracy:** The accuracy of the custom data and overlays heavily depends on the quality of the input data. If the data used to create the overlay is inaccurate or outdated, it can lead to misleading conclusions and decisions.
- **Complexity and Learning Curve:** Creating custom overlays may require some technical expertise or knowledge of Geographic Information System (GIS) software, which could be challenging for users who are not familiar with these tools.
- **Performance Impact:** Introducing multiple complex overlays can potentially slow down the performance of Google Earth Pro, especially if the custom data is extensive or contains high-resolution imagery.
- **Data Security and Privacy:** Custom overlays may involve sensitive data, and there could be concerns about data security and privacy, especially if the overlays are shared publicly or accessed by unauthorized users.
- **Limited Collaboration:** Sharing custom overlays with others can be more complicated than sharing standard Google Earth content, as it requires sharing the underlying data and ensuring everyone has the necessary software and skills to view and interact with the overlays.
- **Dependency on External Data Sources:** If the custom overlays rely on external data sources, there could be issues with data availability, updates, or changes in APIs, potentially rendering the overlays obsolete or dysfunctional.
- **Copyright and Licensing:** Users need to ensure that they have the appropriate rights and permissions to use and display any third-party data or copyrighted materials in their custom overlays, to avoid legal issues.

- **Applications**

- **Urban Planning and Development:** Planners can use custom overlays to visualize proposed infrastructure projects, land-use patterns, and potential environmental impacts, aiding in urban development decision-making.
- **Environmental Monitoring:** Custom overlays can be used to display data on deforestation, pollution, climate change, and wildlife habitats, helping researchers and environmentalists monitor and address critical environmental issues.
- **Real Estate and Property Management:** Real estate professionals can create custom overlays to showcase property boundaries, zoning regulations, nearby amenities, and demographic data to assist clients in making informed decisions.

- **Tourism and Travel:** Travel agencies and tourism boards can use custom overlays to highlight attractions, hotels, restaurants, and transportation options, making it easier for tourists to plan their trips.
- **Agriculture and Land Management:** Farmers and landowners can use custom overlays to analyze soil quality, crop distribution, and irrigation patterns, optimizing agricultural practices and resource management.
- **Education and Research:** Custom overlays serve as valuable educational tools, enabling students and researchers to visualize and analyze geographical data for various subjects, including history, geology, and ecology.
- **Emergency Response and Disaster Management:** During natural disasters or emergencies, custom overlays can aid in coordinating rescue efforts, identifying affected areas, and assessing damages.
- **Business and Market Analysis:** Companies can create custom overlays to analyze market trends, customer distribution, and competitor locations, helping with strategic business planning and expansion decisions.
- **Conservation and Wildlife Management:** Conservation organizations can use custom overlays to track wildlife migration patterns, protected areas, and biodiversity hotspots, aiding in wildlife preservation efforts.

**PRACTICAL: - 2**

**IDENTIFYING THE OPTIMAL PATH**

- **Manan's best optimal path:**

➤ **Introduction:**

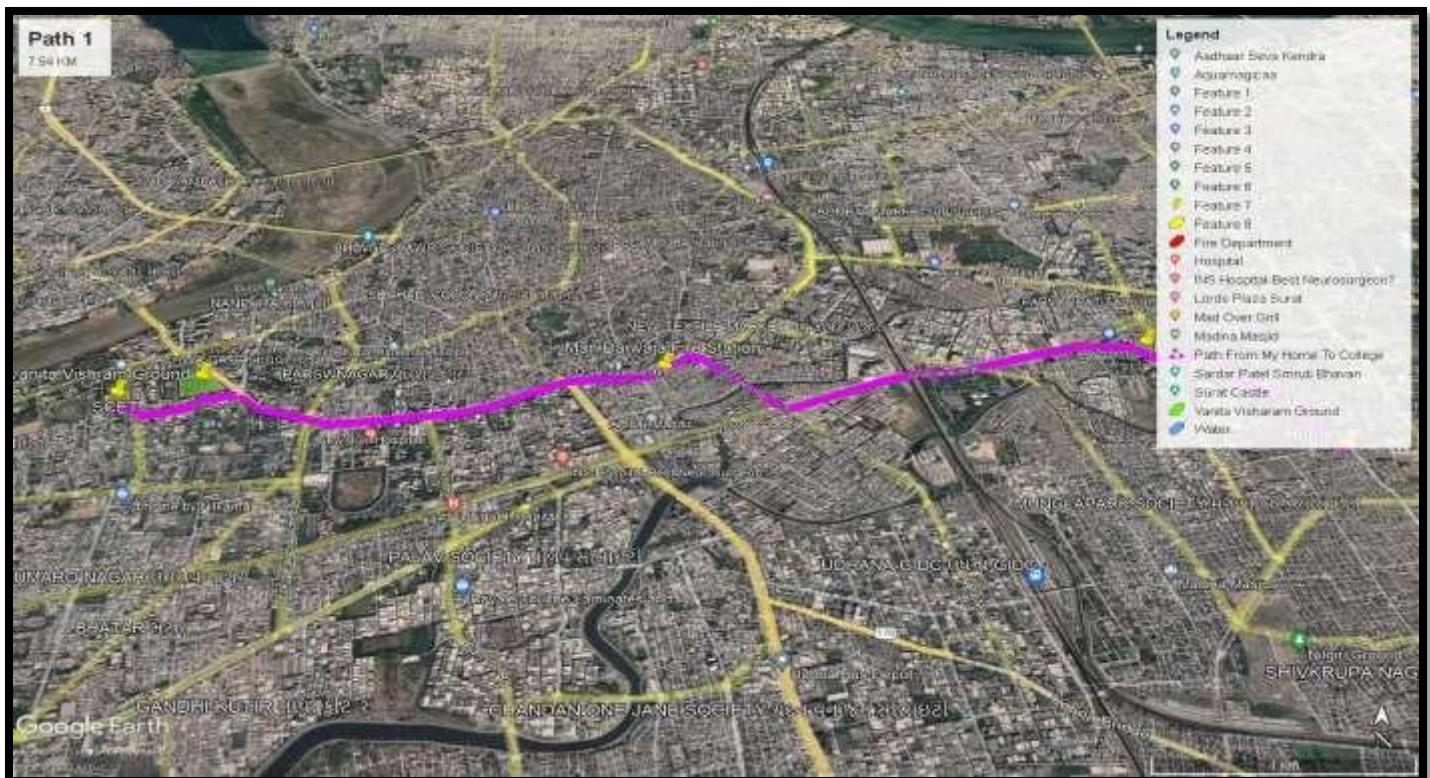
- The Google Earth Pro Path feature is a powerful tool that allows users to create, visualize, and analyze paths between two or more locations on the Earth's surface. In this report, we explore the application of the path feature by creating a route from MY Home to SCET [College] and examining its optimal path, advantages, disadvantages, and potential use cases. Additionally, specific places such as a river (depicted in blue color) and a Fire Station (depicted in red color) have been included in the analysis.

➤ **Use:**

- The primary use of the Google Earth Pro Path feature is to determine the optimal route between two points on the Earth's surface. It assists users in planning and navigation, making it a valuable tool for various purposes, such as commuting, tourism, urban planning, and logistics management. By visualizing and analyzing paths, users can make informed decisions about travel routes, estimated distances, and travel times.

➤ **Optimal Path:**

- For the given locations, two paths have been analyzed:
- Path - 1: Total distance of **7.54 KM**



- Path - 2: Total distance of **9.1 KM**



Based on the analysis, Path - 1 presents the optimal route with the shortest distance, making it a more efficient choice for travel between **SCET and My Home**.

- **Maharshi's best optimal path:**

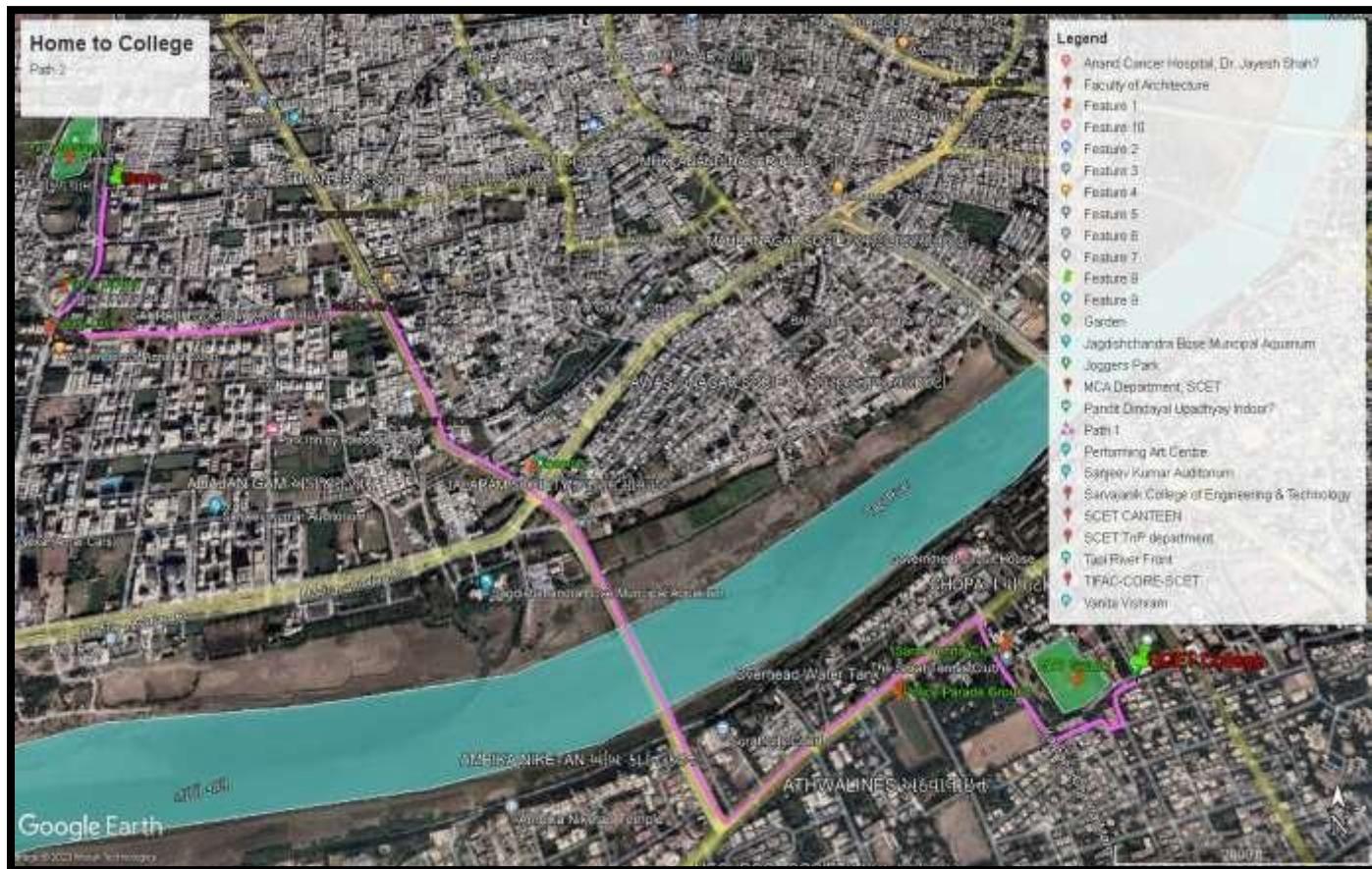
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The Google Earth Pro Path feature is a powerful tool that allows users to create, visualize, and analyse paths between two or more locations on the Earth's surface. In this report, we explore the application of the path feature by creating a route from MY Home to SCET [College] and examining its optimal path, advantages, disadvantages, and potential use cases. Additionally, specific places such as a river (depicted in blue colour) and a Fire Station (depicted in red colour) have been included in the analysis.

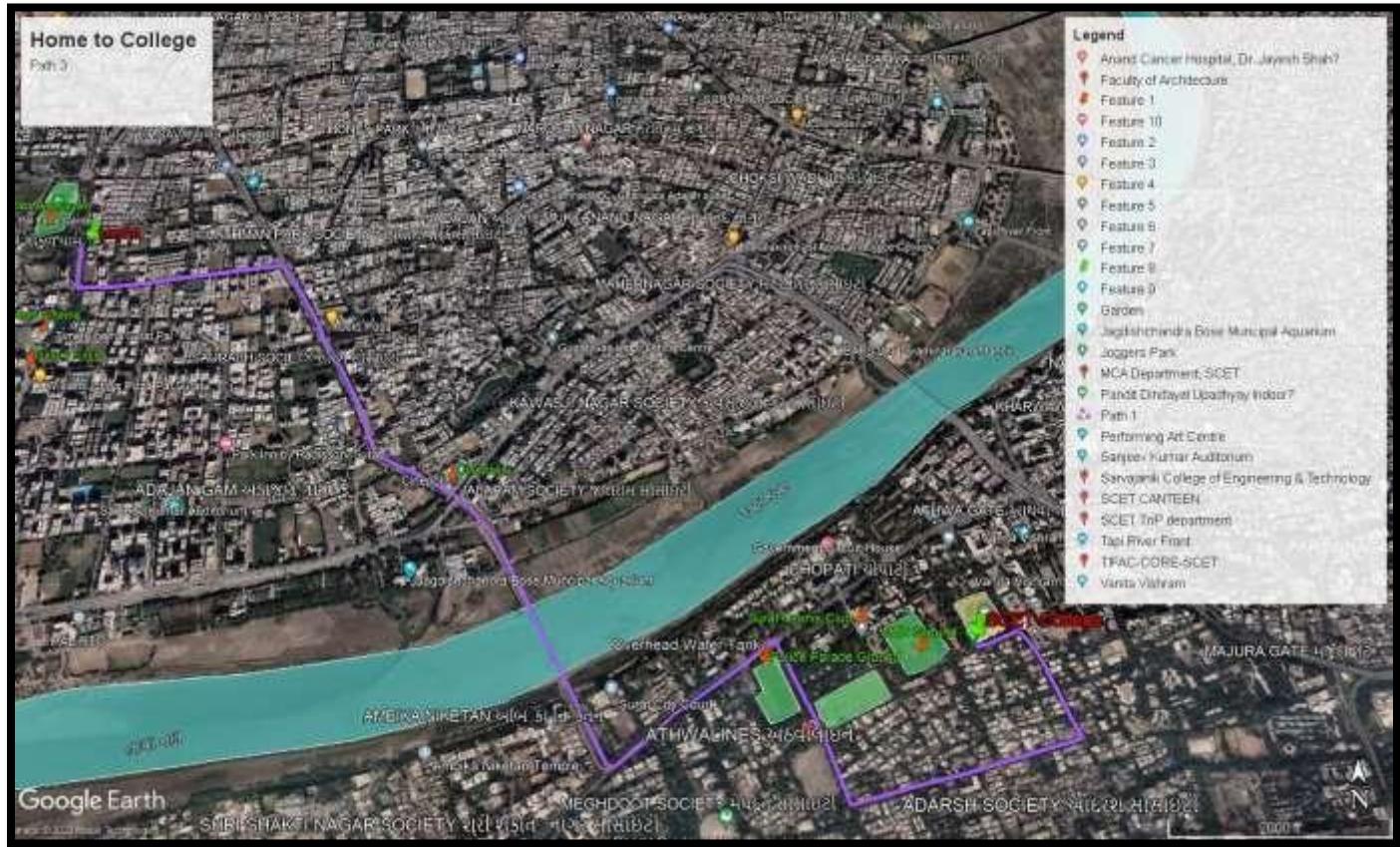
- **Optimal Path:**

- Multiple Paths shown in here from home to scet college.

- **Path 1: 4.89 Kms**



## Path 2: 5.39 Kms



Based on the analysis, Path - 1 presents the optimal route with the shortest distance, making it a more efficient choice for travel between **My Home** and **SCET**.

- **Chirag's best optimal path:**
- **Optimal Path:**
- For the given locations, two paths have been analyzed:
- Path - 1: Total distance of 1.64 KM



- Path - 2: Total distance of 2.20 KM



- 
- 
- Based on the analysis, Path - 1 presents the optimal route with the shortest distance, making it a more efficient choice for travel between **My Home** and **SCET**.

- **Dev's best optimal path:**

## ➤ **Introduction:**

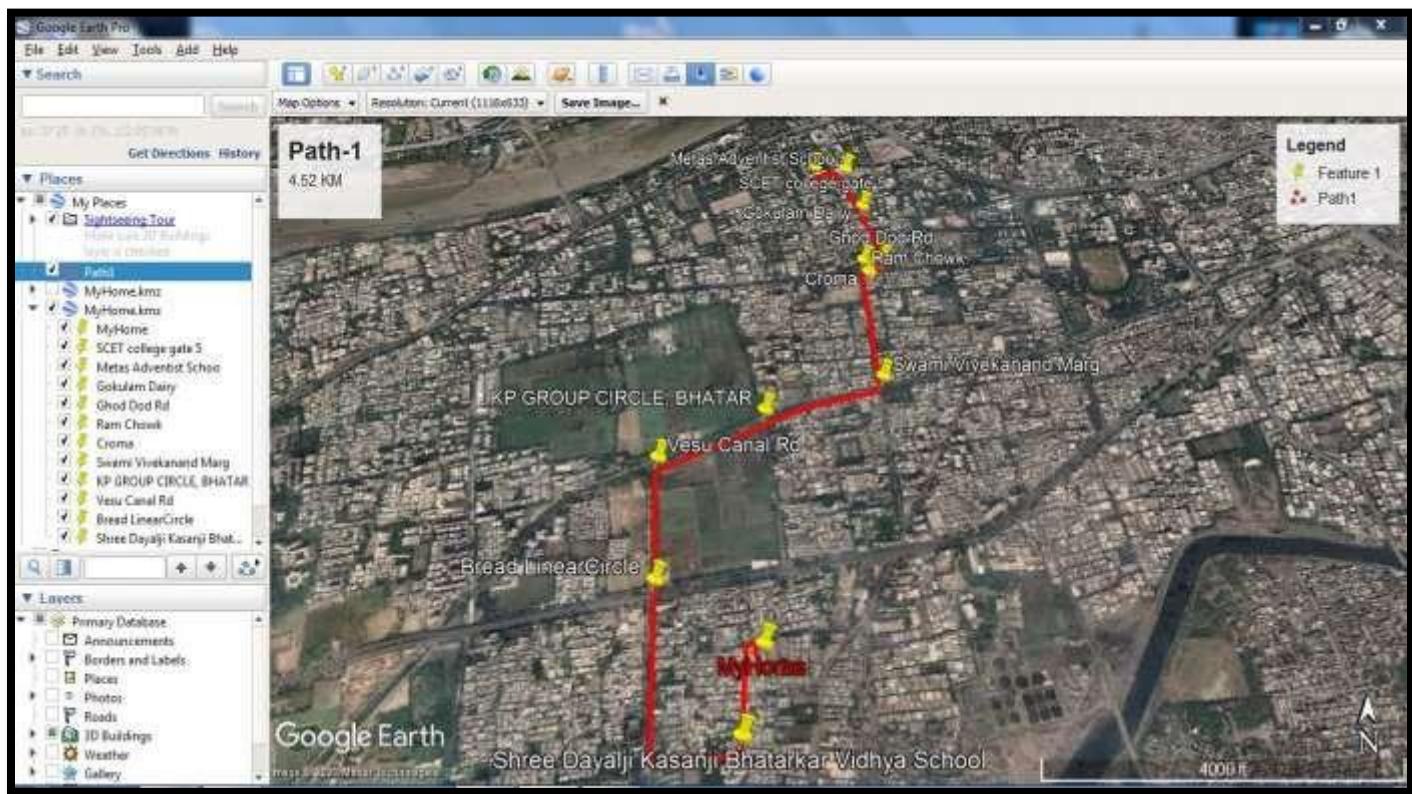
- The Google Earth Pro Path feature is a powerful tool that allows users to create, visualize, and analyze paths between two or more locations on the Earth's surface. In this report, we explore the application of the path feature by creating a route from MY Home to SCET [College] and examining its optimal path, advantages, disadvantages, and potential use cases.

## • **Use:**

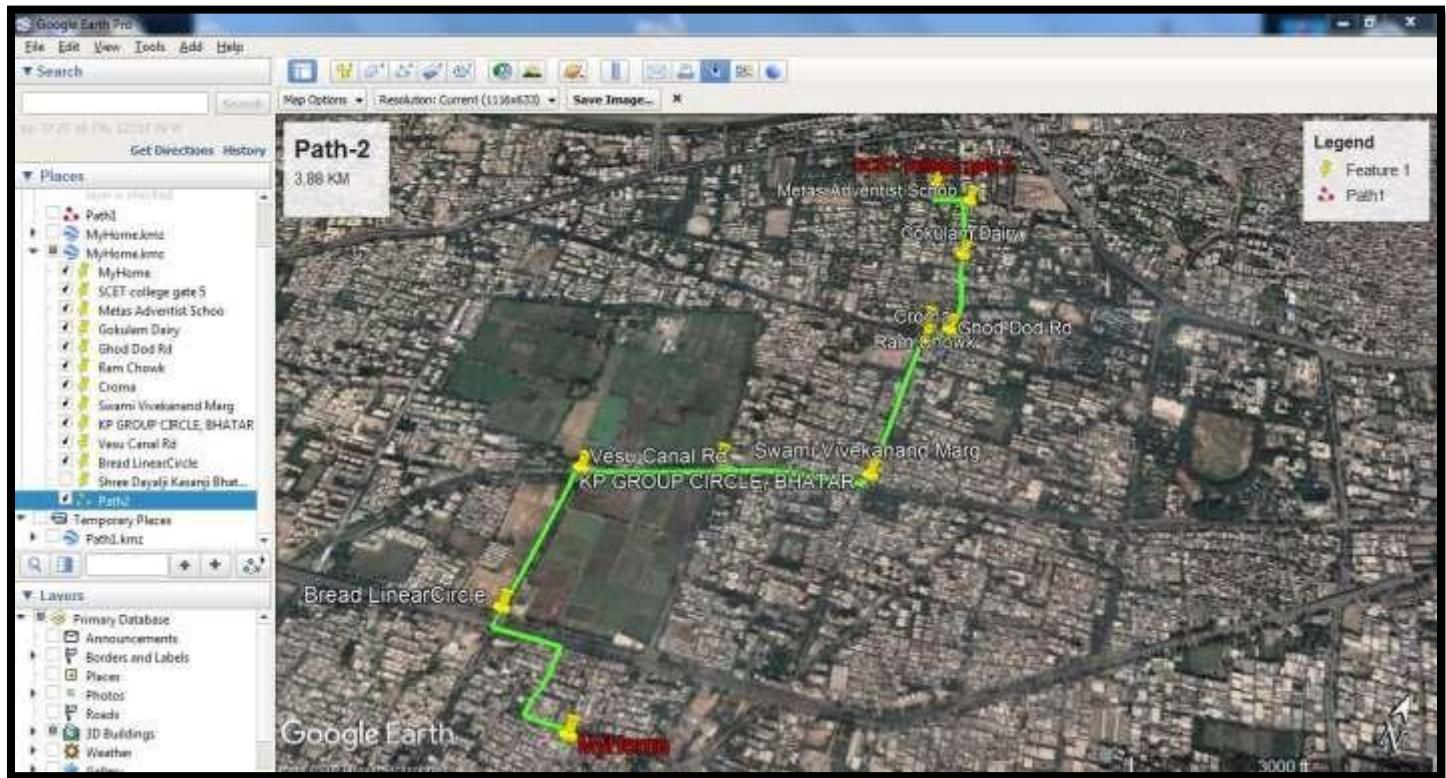
- The primary use of the Google Earth Pro Path feature is to determine the optimal route between two points on the Earth's surface. It assists users in planning and navigation, making it a valuable tool for various purposes, such as commuting, tourism, urban planning, and logistics management. By visualizing and analyzing paths, users can make informed decisions about travel routes, estimated distances, and travel times.

## ➤ **Optimal Path:**

- For the given locations, two paths have been analyzed:
- Path - 1: Total distance of **4.52 KM**



- Path - 2: Total distance of **3.88 KM**

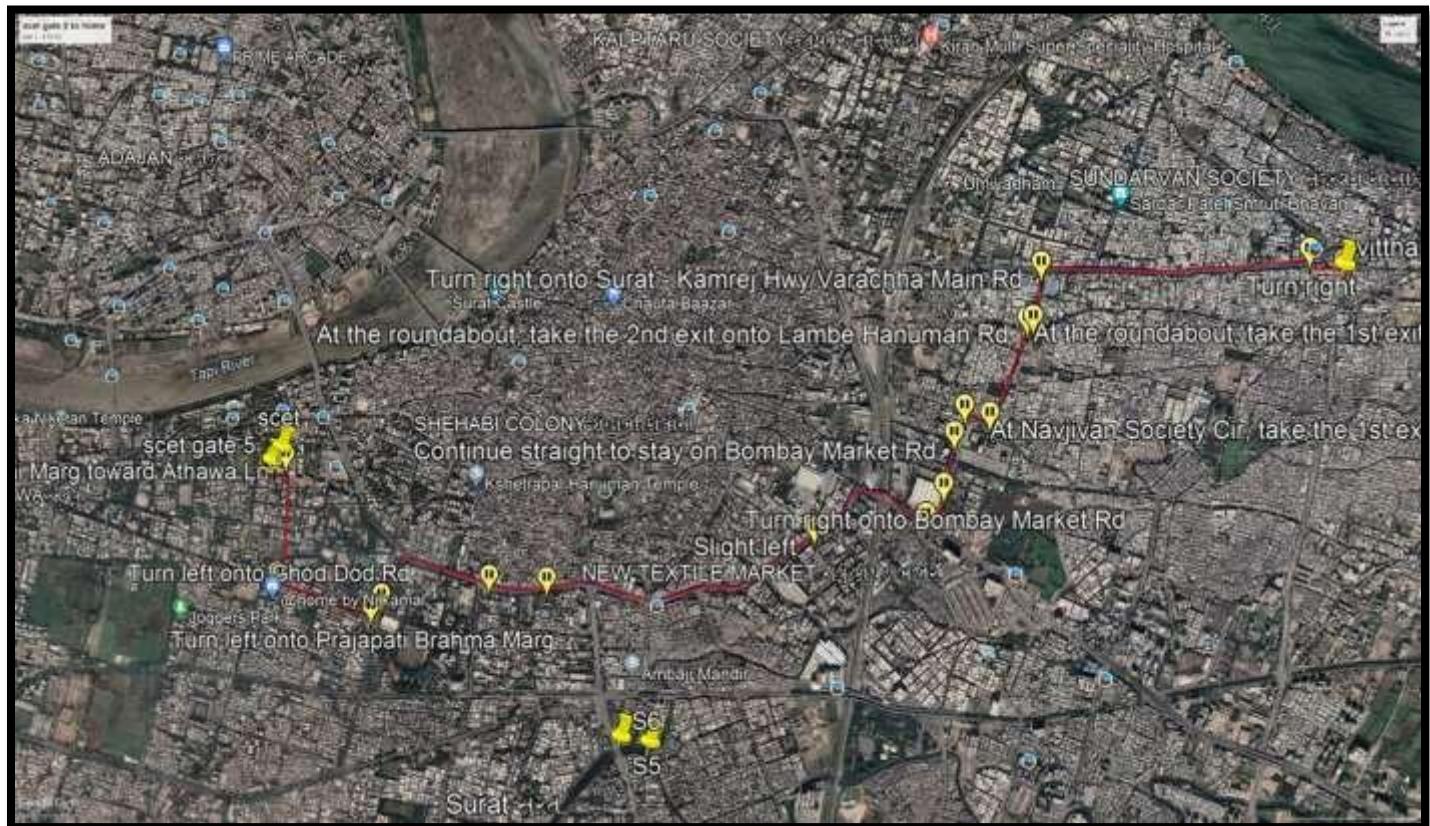


- Based on the analysis, Path - 2 presents the optimal route with the shortest distance, making it a more efficient choice for travel between **SCET** and **My Home**.

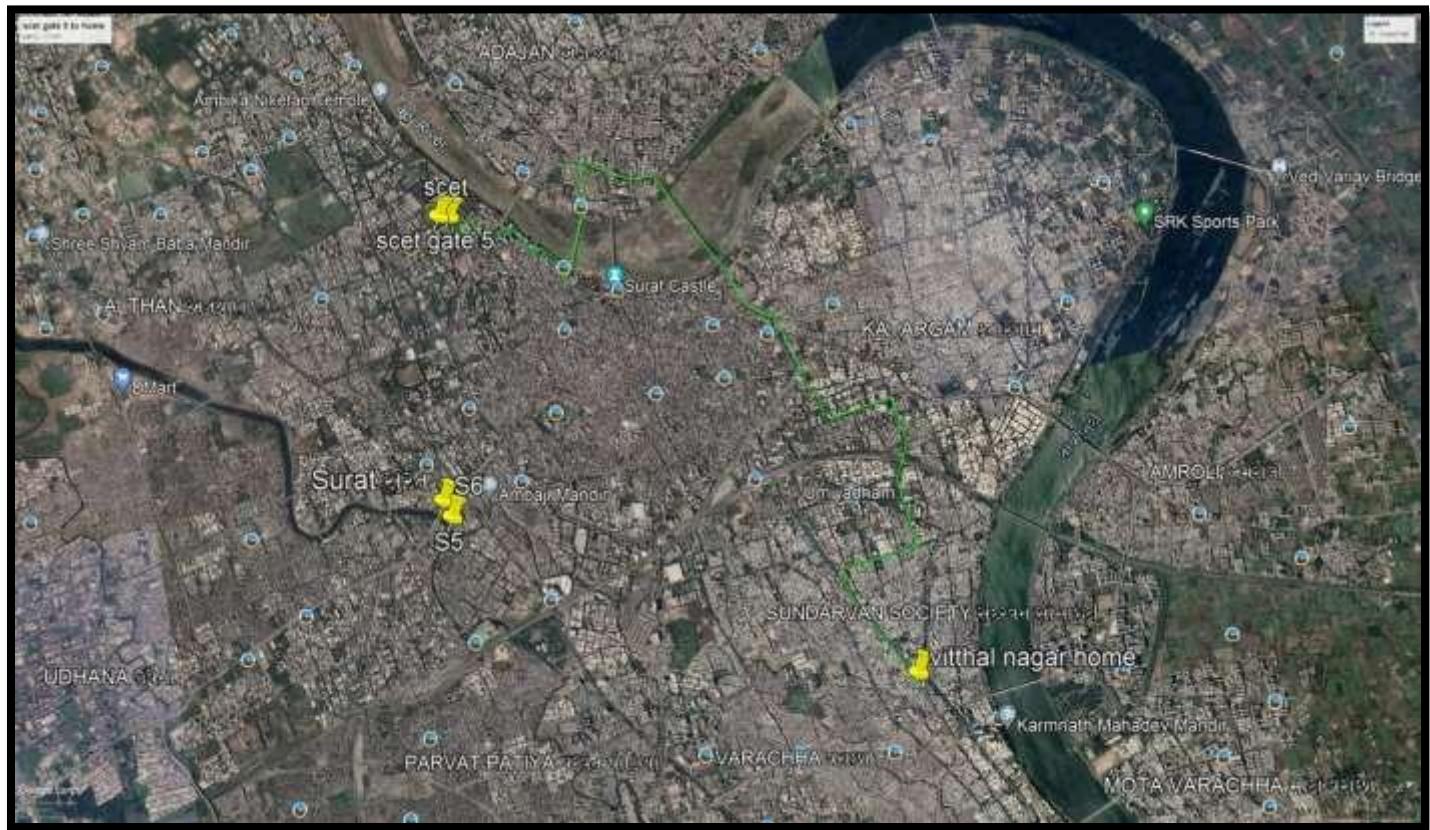
- **Avush's best optimal path:**

➤ **Optimal Path:**

- For the given locations, two paths have been analyzed:
- Path - 1: **9.4 KM**



- Path - 2: **11 KM**



- **Advantages:**

1. **Visual Representation:** The path feature provides a clear visual representation of the route, helping users understand the geographical context and landmarks along the way.
2. **Distance and Time Calculation:** Users can calculate the distance and estimated time of travel between locations, aiding in route planning and scheduling
3. **Alternative Routes:** Google Earth Pro offers multiple path options, allowing users to explore alternative routes and choose the most suitable one
4. **Integration with Other Data Layers:** The path feature can be integrated with other data layers, such as terrain, traffic, and satellite imagery, enhancing the overall analysis and decision-making process.

- **Disadvantages:**

1. **Dependency on Data Accuracy:** The accuracy of the path feature relies on the accuracy of underlying geographic data. Inaccuracies in the mapping data can lead to suboptimal route suggestions.
2. **Limited Real-Time Updates:** Google Earth Pro's path feature may not provide real-time updates on traffic conditions, road closures, or other dynamic factors that affect navigation
3. **Complex Routes:** In some cases, the optimal path suggested by Google Earth Pro may be complex or involve unnecessary detours, requiring users to exercise their judgment.

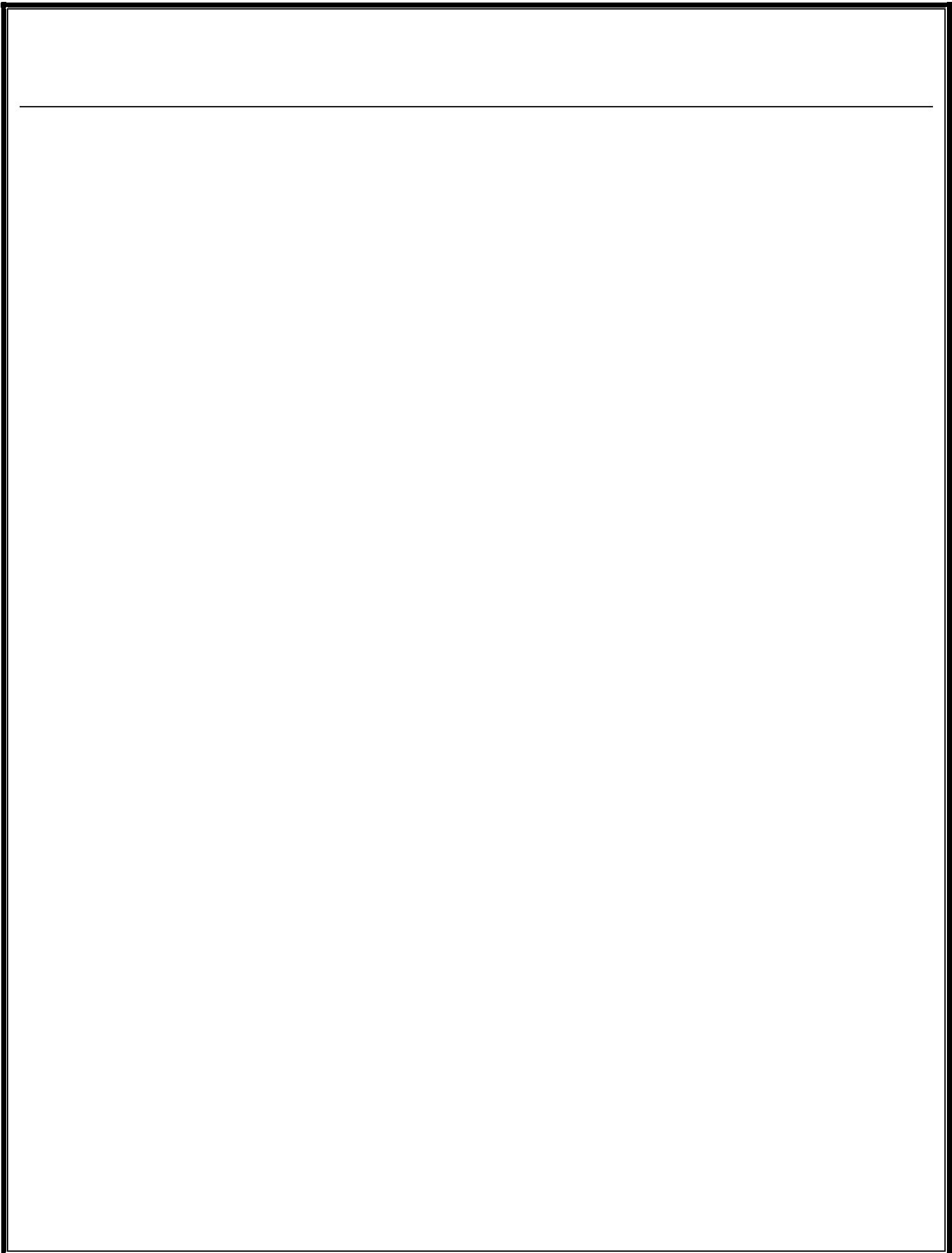
- **Application of Path Feature:**

The path feature of Google Earth Pro finds applications in various fields:

1. **Urban Planning:** City planners can use the path feature to analyze transportation routes, traffic patterns, and connectivity between different areas of a city.
2. **Tourism and Travel:** Tourists can plan their itineraries and explore the best routes to visit multiple attractions in a destination efficiently.
3. **Environmental Studies:** Researchers can use the path feature to analyze wildlife migration routes, study environmental changes, and plan conservation efforts.
4. **Emergency Response:** During disaster management, the path feature can help authorities plan evacuation routes and response strategies.

## **Practical-3**

### **Data collection from Bhuvan**



- **Manan:**

## 1. **Bhuvan Timelapse**

- In this feature we can see the past data of the particular area that how it is transform over the time and how it is developed and looks over the time from the satellite.
- We can find this feature under **Bhuvan Central Applications -> Special Applications**.
- Below is the ***Kashi Vishwanath Corridor*** pictures by time-lapse feature.





## 2. Thematic Services

- The Bhuvan Thematic Services are a set of web-based services that provide access to a variety of geospatial data, including imagery, maps, and terrain data. This data can be used for a variety of purposes, such as urban planning, disaster management, and agriculture.
- Thematic services are offered by the National Remote Sensing Centre (NRSC), which is a part of the Indian Space Research Organisation (ISRO). Thematic services are available to anyone who has an internet connection.

Bhuvan-Thematic Services facilitate the users to select, browse and query the Thematic Datasets from this portal. Users can consume these Thematic Datasets and integrate into their systems as OGC Web Services.

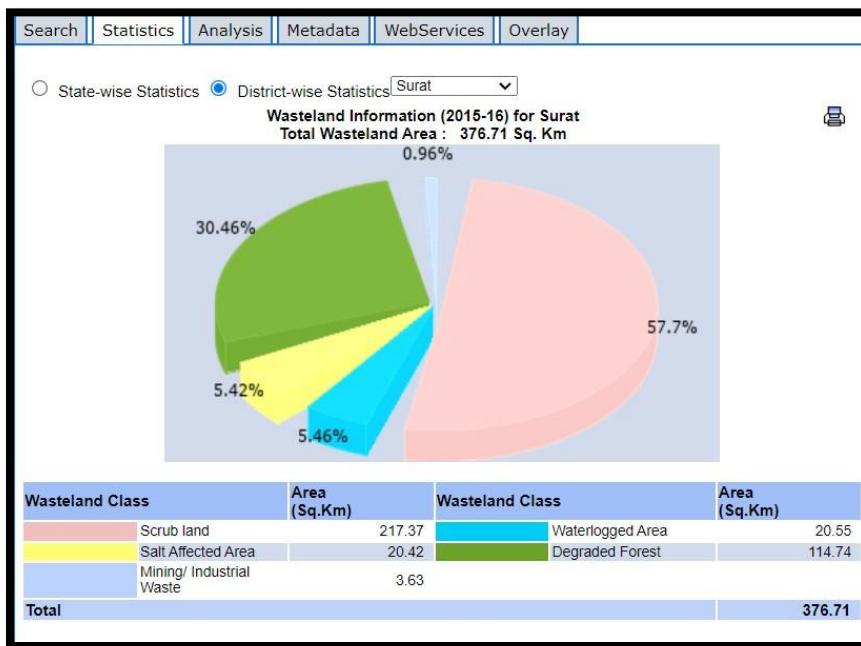
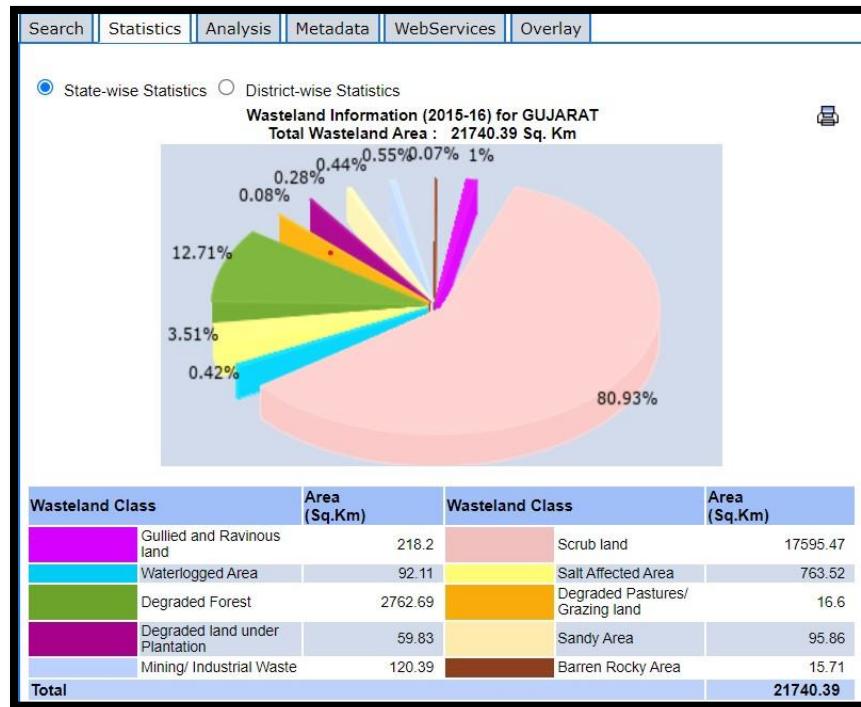
Search Statistics Analysis Metadata WebServices Overlay

Select Theme: Wasteland(50K):2015-16

Select State: GUJARAT

1. Technical document 2. Map 3. Wasteland Atlas

**View**



## I. Data Identification Information

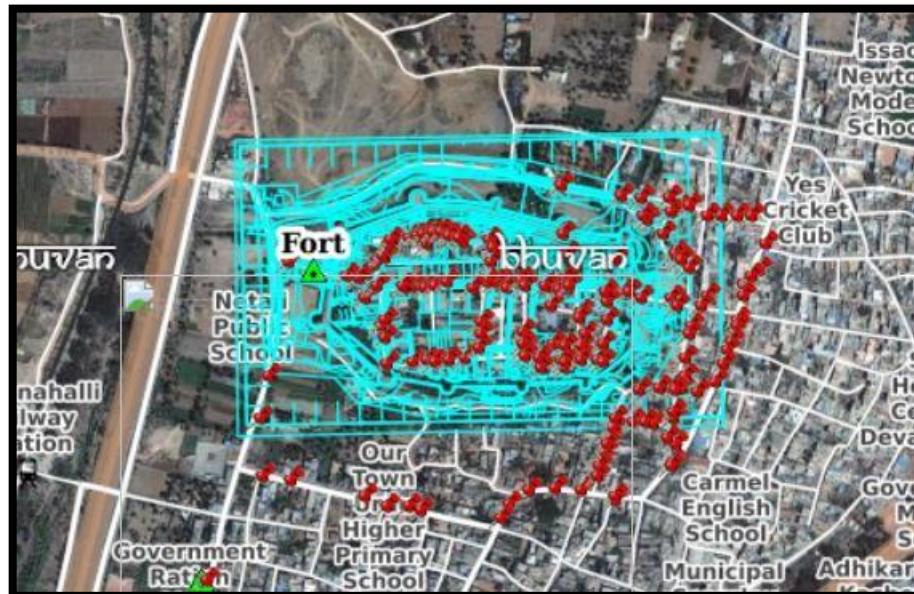
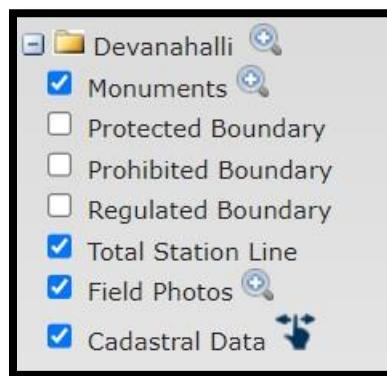
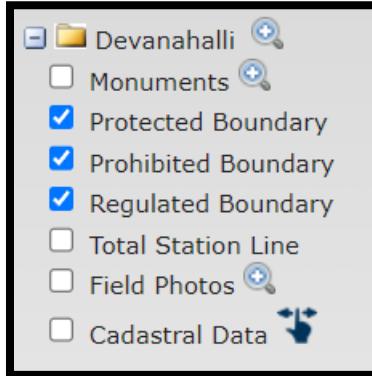
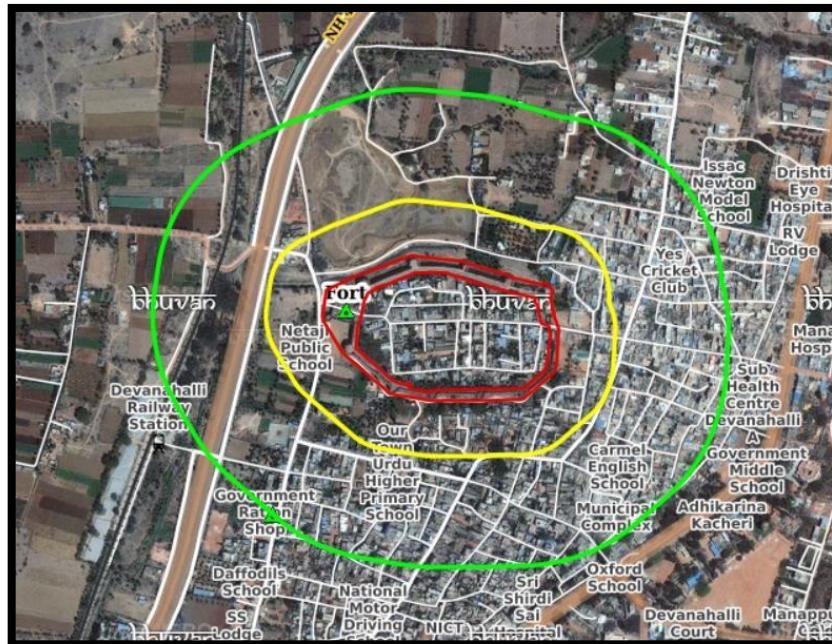
1	Name of the Dataset	Gujarat
2	Theme	Wasteland
3	Keywords	Wastelands, 50K, GUJARAT , NRSC, ISRO

4	Access Constraints	As per NRSC Data Dissemination Policy
5	Use Constraints	As per NRSC Data Dissemination Policy
6	Purpose of creating data	To generate digital wasteland database for Ministry Rural Development, Government of India
7	Data Type	Vector data
8	Edition	First
9	Status	Completed

### **3. Archaeological Survey of India [Tourism]**

- The Archaeological Survey of India (ASI) Bhuvan feature is a web-based application that provides access to a variety of information about archaeological sites and monuments in India. The application is developed by the National Remote Sensing Centre (NRSC), which is a part of the Indian Space Research Organisation (ISRO).
- The ASI Bhuvan feature provides users with the following capabilities:
- View high-resolution satellite imagery of archaeological sites and monuments. The imagery can be viewed at different scales, so users can zoom in and out to see the details.
- Browse and search a database of archaeological sites and monuments. The database contains information about the location, type, and period of each site and monument.
- View 3D models of archaeological sites and monuments. The 3D models can be rotated and zoomed in and out to see the sites from different angles.

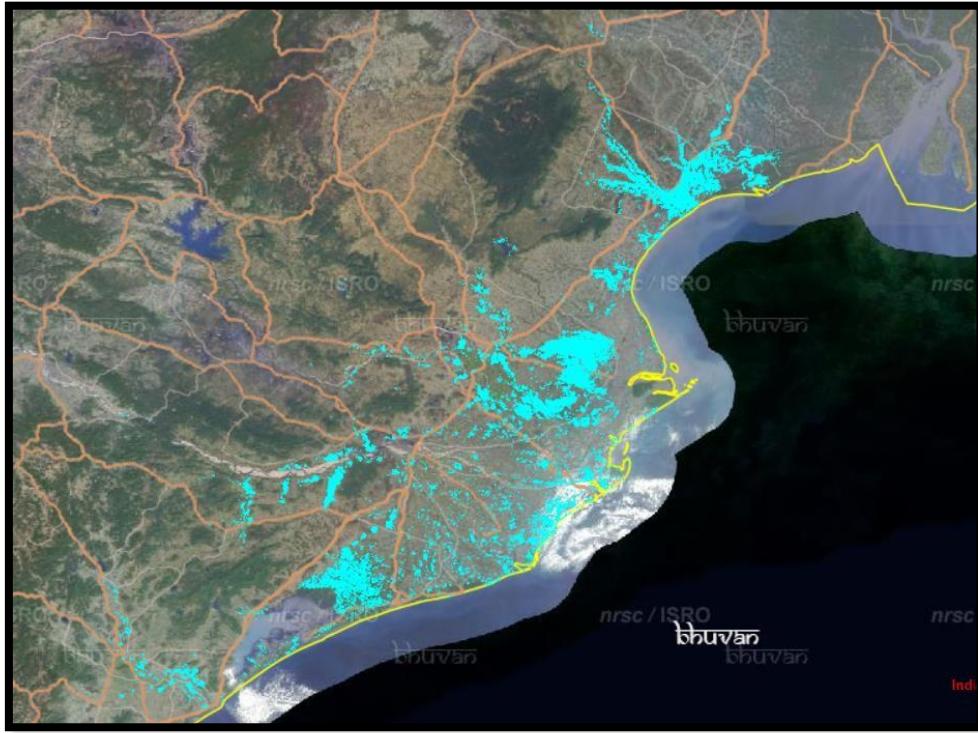




## **4. Near Real Time Cyclone Monitoring**

- The Bhuvan GIS tool can be used for near real-time cyclone monitoring in the following ways:
- **Satellite imagery:** Bhuvan provides access to satellite imagery from a variety of sources, including the Indian Space Research Organisation (ISRO) and the National Oceanic and Atmospheric Administration (NOAA). This imagery can be used to track the movement of cyclones and to assess the damage they have caused.
- **Weather forecasts:** Bhuvan provides access to weather forecasts from the Indian Meteorological Department (IMD). These forecasts can be used to track the predicted path of cyclones and to prepare for their arrival.
- **Cyclone tracking models:** Bhuvan provides access to cyclone tracking models from a variety of sources. These models can be used to predict the future movement of cyclones and to estimate their intensity.





## 5. Thematic Services

- The Bhuvan GIS tool provides a variety of resources that can be used to assess flood hazard in India. These resources include:
- **Flood hazard maps:** Bhuvan provides flood hazard maps for India at different scales. These maps show the areas that are most at risk of flooding.
- **Flood risk assessment tools:** Bhuvan provides tools that can be used to assess the risk of flooding in a particular area. These tools take into account factors such as topography, rainfall, and land use.
- **Flood monitoring data:** Bhuvan provides data on flood events, such as the location, intensity, and duration of floods.

The maximum flood inundation layers corresponding to various years (1998-2019) were integrated for assessing the frequency of inundation and subsequent generation of hazard layer

**State** Bihar

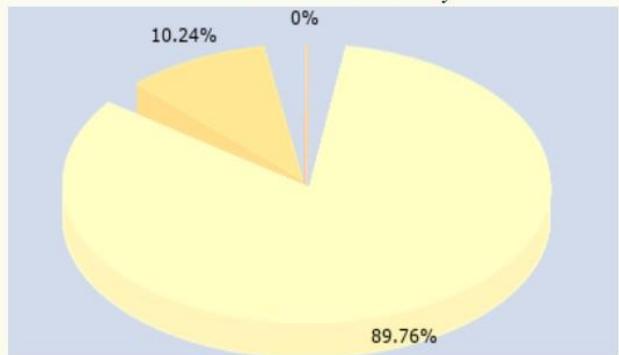
**District** Gaya

**Remove** **Statistics** [Technical document](#) 

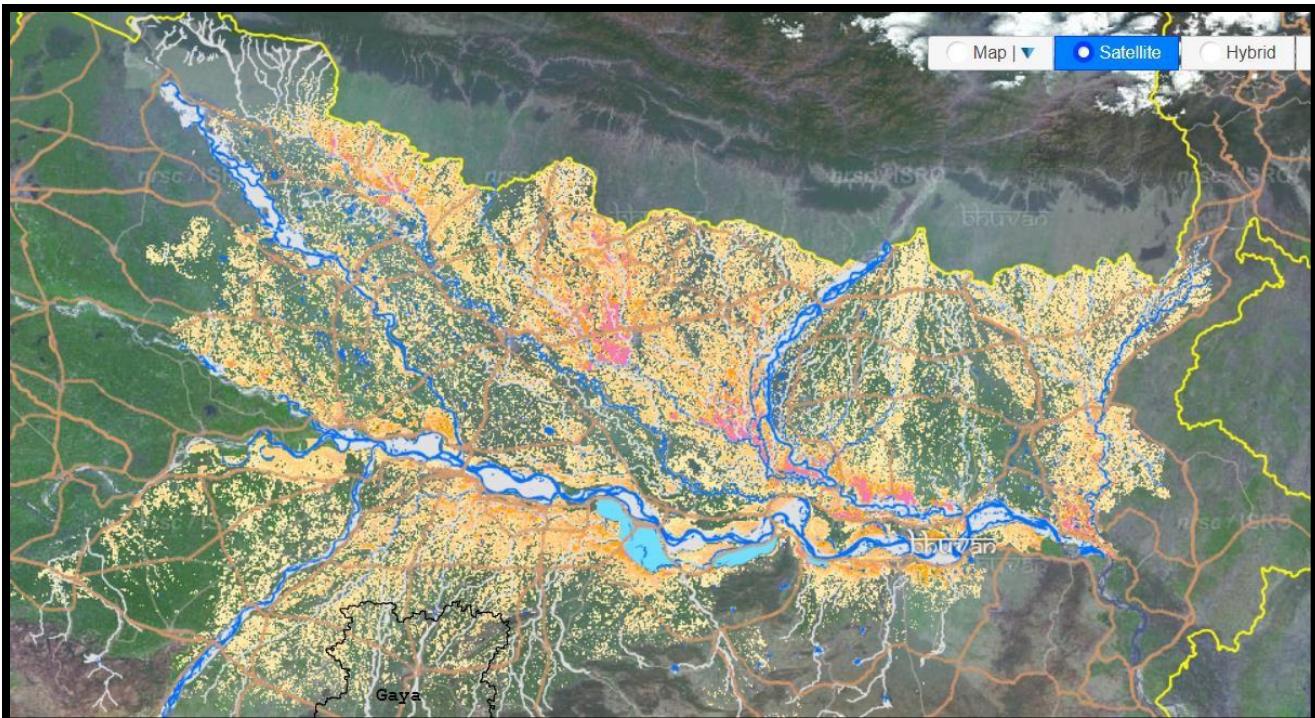
- Very High
- High
- Moderate
- Low
- Very Low
- Tal

State-wise Statistics  District-wise Statistics

### Flood Hazard statistics for Gaya



Hazard Severity	Area (ha)
Very Low	47090
Low	6399
Moderate	382
High	0
Very High	0
<b>Total</b>	<b>53871</b>

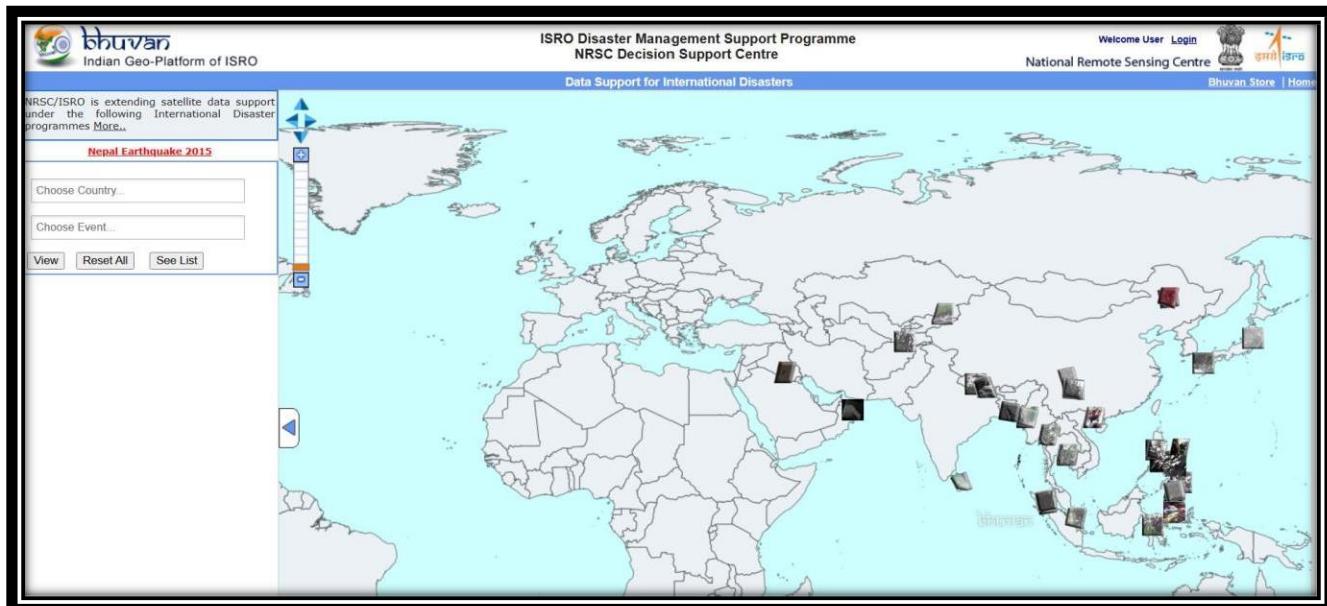


- **Maharshi:**

## 1. **Bhuvan International Disasters Tool:**

Bhuvan, developed by ISRO, is primarily known for its applications in Indian geospatial and disaster management. However, it has also been utilized in international disaster response and mitigation efforts.

1. Satellite Imagery: Bhuvan offers access to high-resolution satellite imagery that can be used for disaster monitoring and damage assessment anywhere in the world. This imagery can be vital for international agencies and governments when responding to natural or man-made disasters.
2. Data Sharing: Bhuvan facilitates the sharing of geospatial data, which is crucial for international collaboration during disaster events. This data can include information on affected areas, infrastructure, and population distribution.
3. Customized Tools: Bhuvan can be customized to create specific tools and applications for disaster management. These tools can assist in tasks such as damage assessment, evacuation planning, and resource allocation.
4. Remote Sensing: The platform leverages remote sensing technology to collect and analyze data, making it useful for international organizations and governments looking to gather information in the aftermath of a disaster.



**bhuvan**  
Indian Geo-Platform of ISRO

ISRO Disaster Management Support Programme  
NRSC Decision Support Centre

Welcome User [Login](#)  
National Remote Sensing Centre   
[Bhuvan Store](#) | [Home](#)

NRSC/ISRO is extending satellite data support under the following International Disaster programmes [More...](#)

Nepal Earthquake 2015

Nepal Flood

View Reset All See List

Nepal

Flood on 07-May-2012  
ResourceSat-2 AWIFS 1 Scenes [View](#)

Flood on 02-Feb-2012  
ResourceSat-2 AWIFS 1 Scenes [View](#)

Data Support for International Disasters



Nepal  
Landslide on 03-Aug-2014  
RISAT-2 1 Scenes [View](#)

**bhuvan**  
View Scenes X

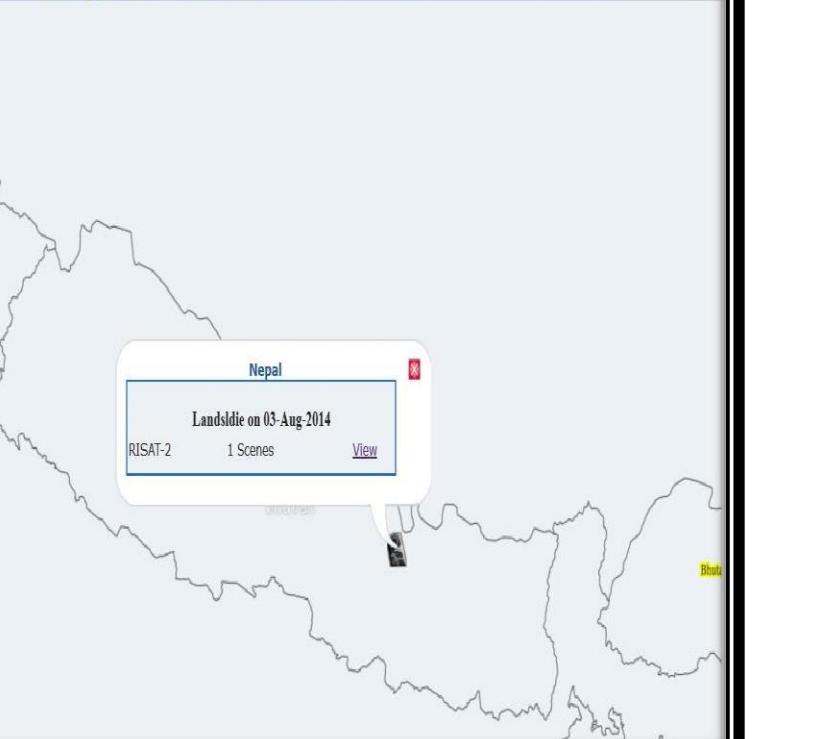
ISRO Disaster Management Support Programme  
NRSC Decision Support Centre

Welcome User [Login](#)  
National Remote Sensing Centre   
[Bhuvan Store](#) | [Home](#)

Date of Pass :04Aug14 Scene :1  
1

Download

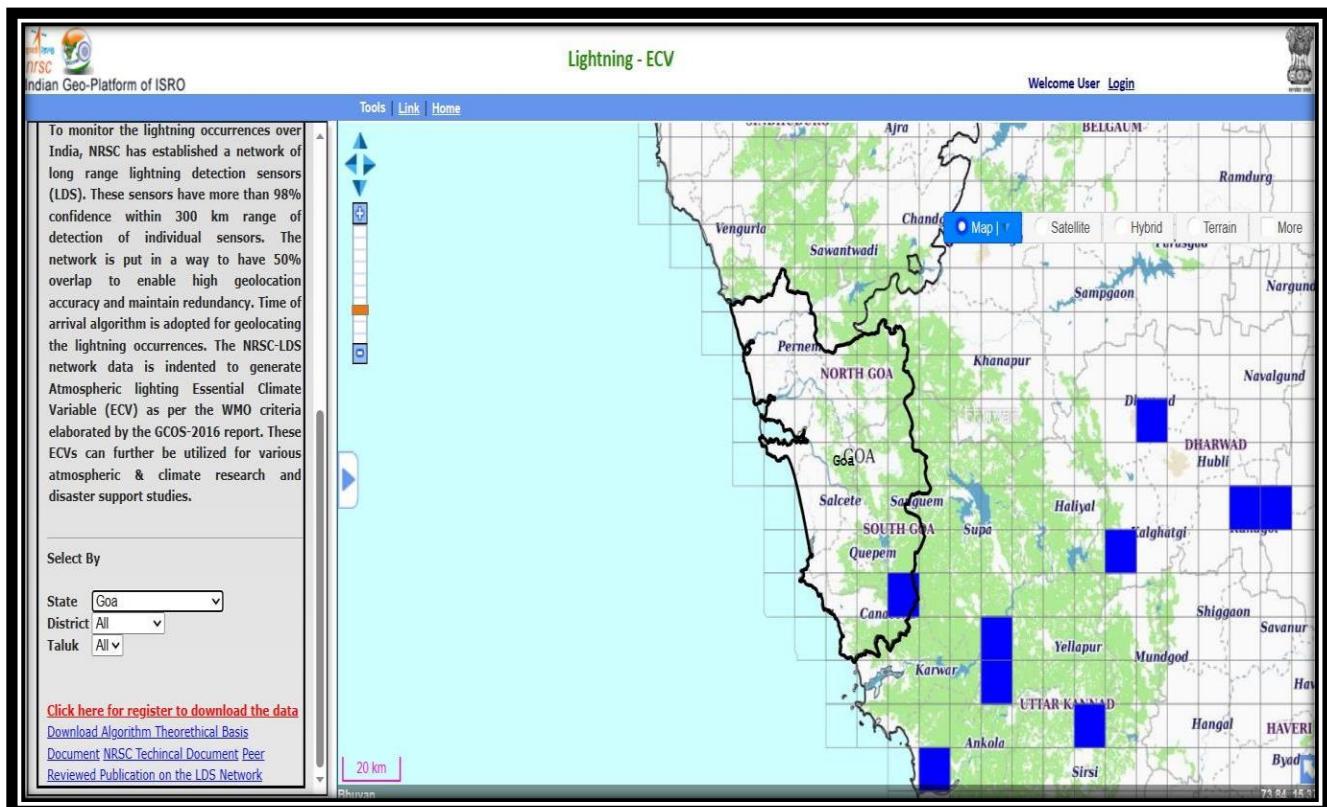
Data Support for International Disasters

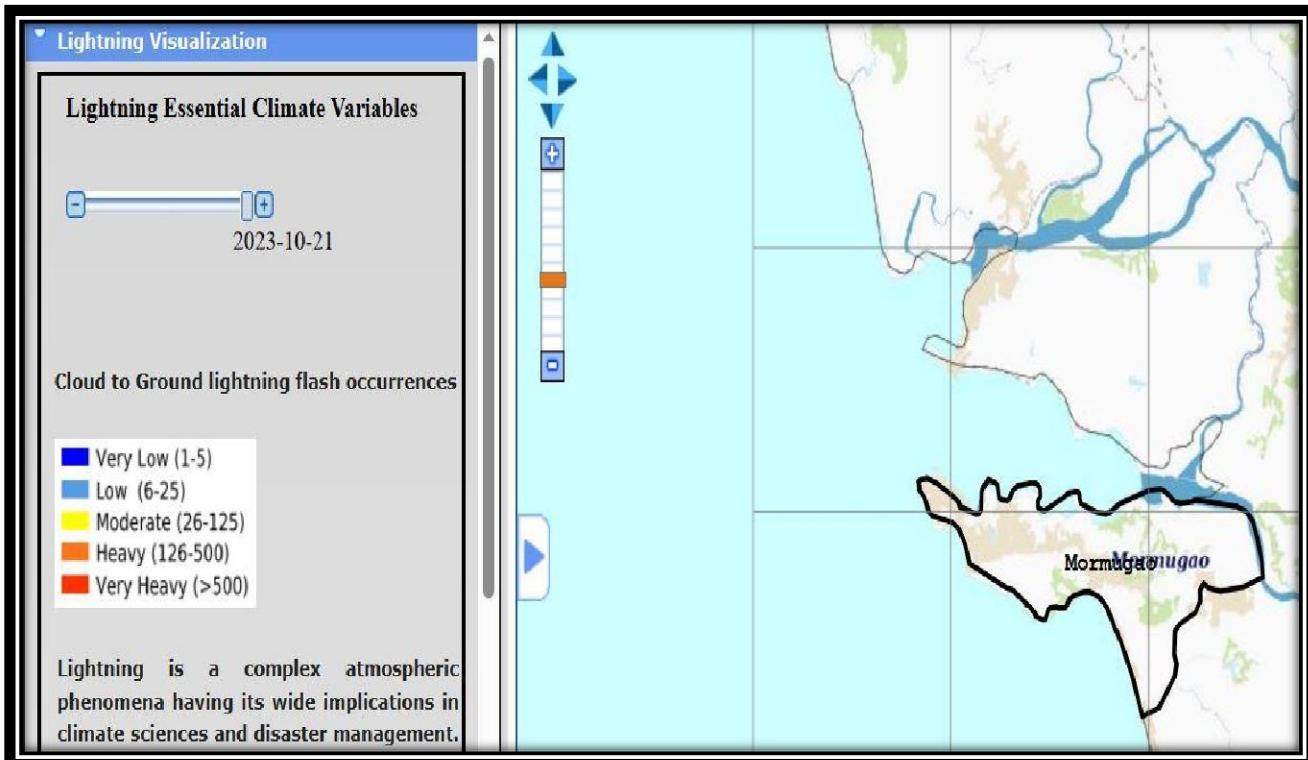
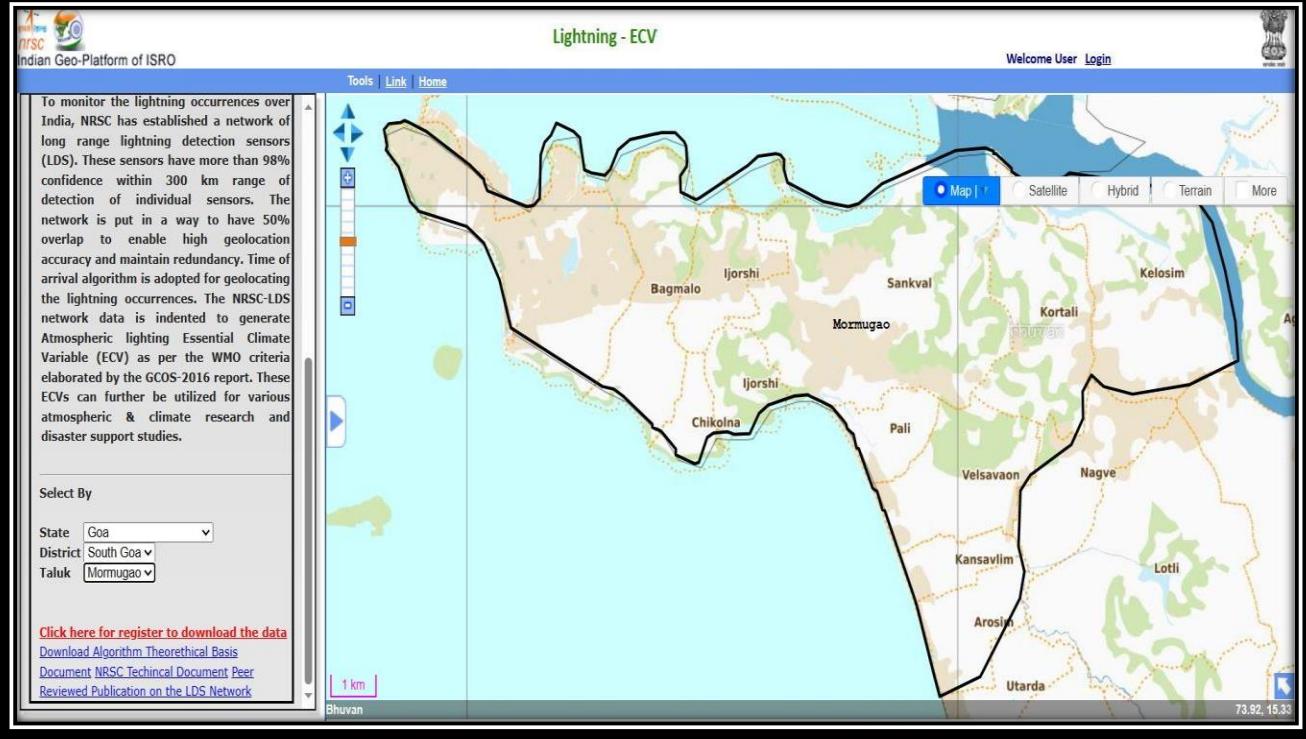


Nepal  
Landslide on 03-Aug-2014  
RISAT-2 1 Scenes [View](#)

## **2. Bhuvan International Disasters Tool:**

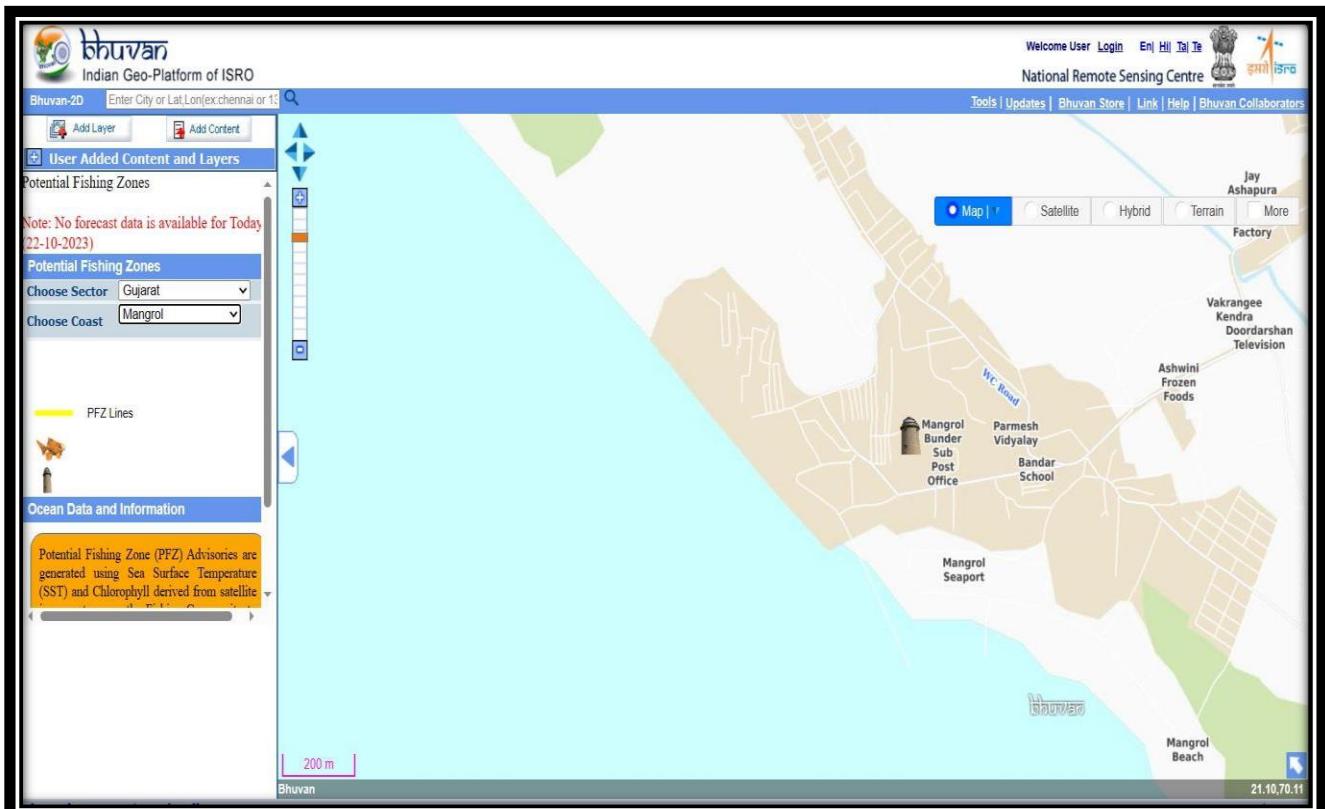
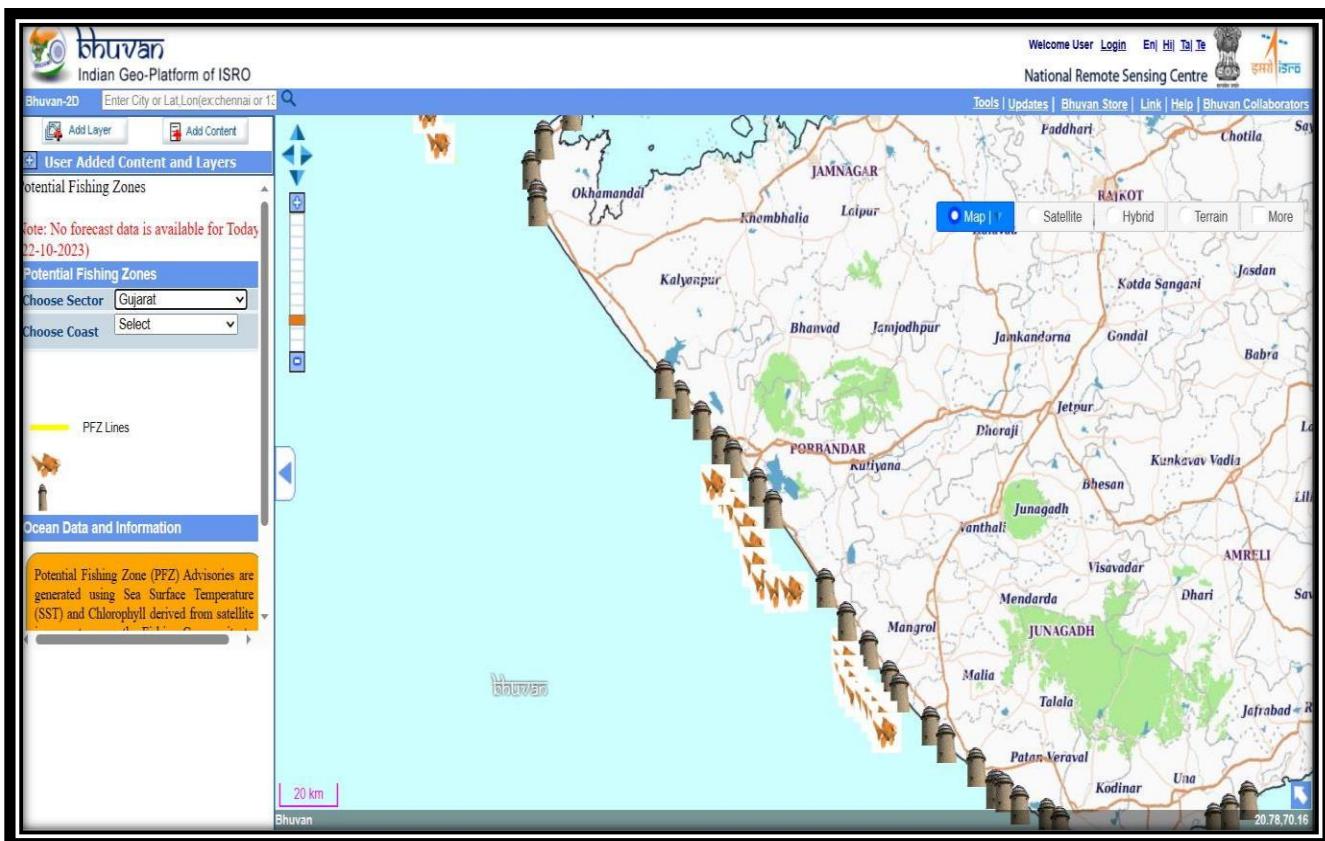
- Lightning is a complex atmospheric phenomenon having its wide implications in climate sciences and disaster management.
- To monitor the lightning occurrences over India, NRSC has established a network of long-range lightning detection sensors (LDS). These sensors have more than 98% confidence within 300 km range of detection of individual sensors. The network is put in a way to have 50% overlap to enable high geolocation accuracy and maintain redundancy.
- Time of arrival algorithm is adopted for geolocating the lightning occurrences. The NRSC-LDS network data is indented to generate Atmospheric lighting Essential Climate Variable (ECV) as per the WMO criteria elaborated by the GCOS-2016 report. These ECVs can further be utilized for various atmospheric & climate research and disaster support studies.





### **3. Bhuvan Ocean Services Tool:**

- Bhuvan is a web-based geoportal developed by the Indian Space Research Organization (ISRO) that provides satellite imagery and geospatial data of India.
- One of the services offered by Bhuvan is the Ocean Services tool, which provides Potential Fishing Zone (PFZ) advisories and information on sea derived from satellite imagery. Potential Fishing Zone (PFZ) advisories are a reliable and short-term forecast on the fish aggregation zones in the open sea.
- They are generated by the Indian National Centre for Ocean Information Services (INCOIS) using satellite data. The advisories help fishermen to locate potential zones of fish aggregation, thereby reducing the time and effort spent in searching for fish, and improving their profitability and socio-economic status.
- PFZ advisories are particularly beneficial to artisanal, motorized, and small mechanized sector fishermen engaged in pelagic fishing activities such as ring seining, gill netting, etc., as they help save valuable fuel oil and human effort
- The tool allows users to select coastal states and corresponding fishing zones from two drop-down boxes. Upon selection, the map takes you to that location, and a fish icon is displayed. Clicking on the fish icon provides information on wind direction, depth of that zone, distance from the shore, etc., of the coast.



#### **4. Bhuvan Thematic Services Tool:**

- The Bhuvan Thematic Services are a set of web-based services that provide access to a variety of geospatial data, including imagery, maps, and terrain data. This data can be used for a variety of purposes, such as urban planning, disaster management, and agriculture.
- Thematic services are offered by the National Remote Sensing Centre (NRSC), which is a part of the Indian Space Research Organisation (ISRO). Thematic services are available to anyone who has an internet connection.

Bhuvan-Thematic Services facilitate the users to select, browse and query the Thematic Datasets from this portal. Users can consume these Thematic Datasets and integrate into their systems as OGC Web Services.

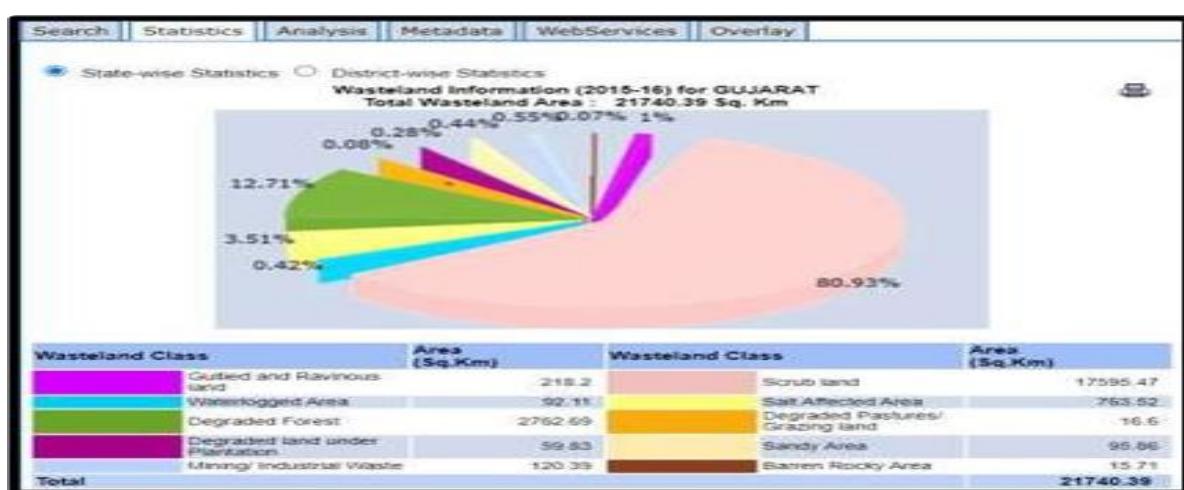
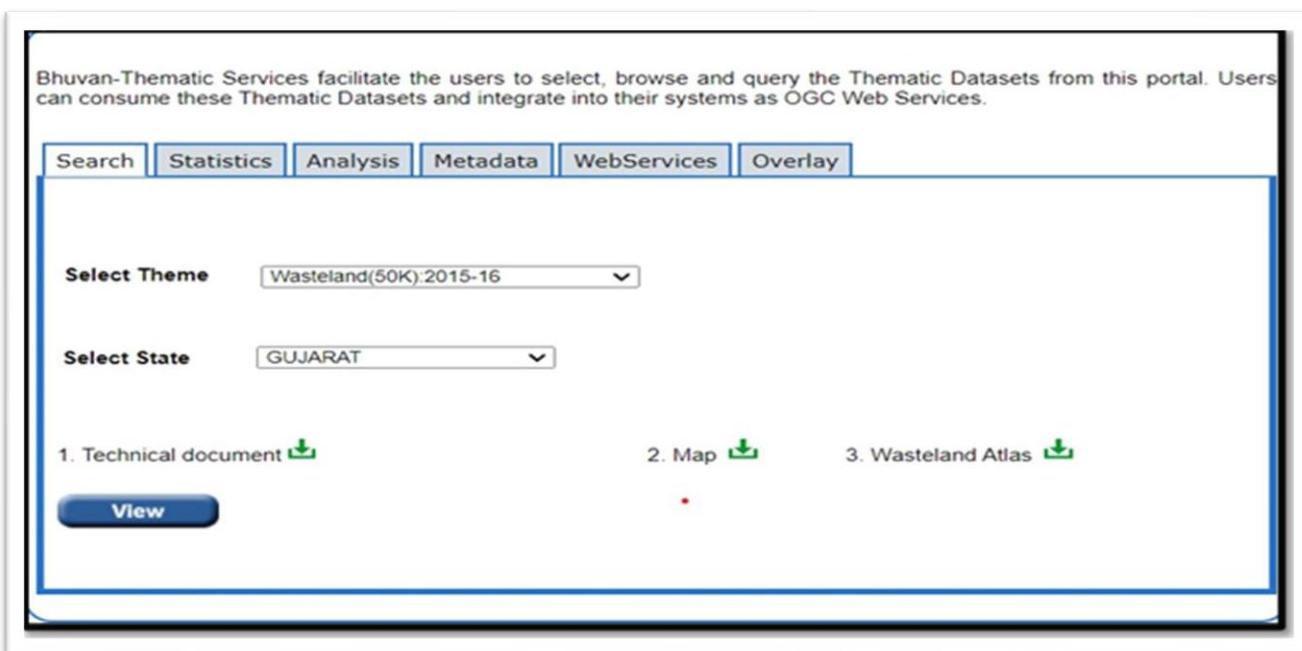
Search Statistics Analysis Metadata WebServices Overlay

Select Theme Wasteland(50K):2015-16

Select State GUJARAT

1. Technical document 2. Map 3. Wasteland Atlas

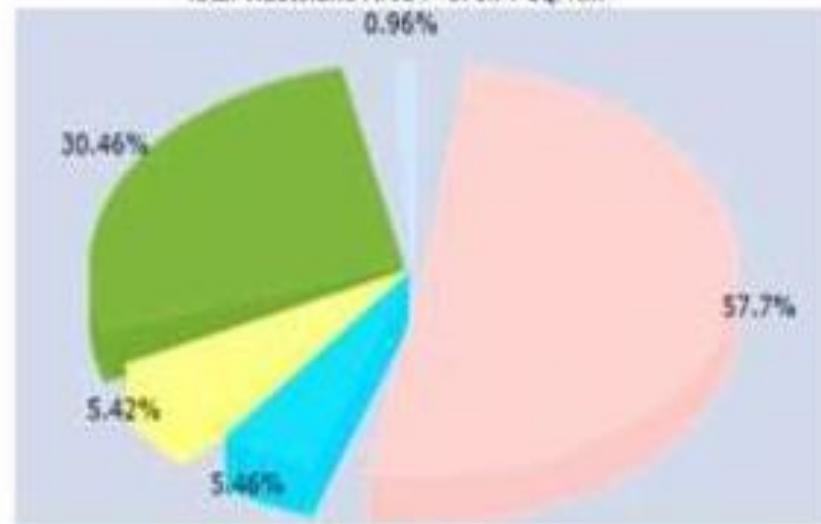
**View**



State-wise Statistics District-wise Statistics

Surat

▼

Wasteland Information (2015-16) for Surat  
Total Wasteland Area : 376.71 Sq. Km

Wasteland Class	Area (Sq.Km)	Wasteland Class	Area (Sq.Km)
Scrub land	217.37	Waterlogged Area	20.55
Salt Affected Area	20.42	Degraded Forest	114.74
Mining/ Industrial Waste	3.63		
<b>Total</b>			<b>376.71</b>

## 5. Archaeological Survey of India Tool:

The Archaeological Survey of India (ASI) has collaborated with Bhuvan, the geospatial portal developed by the Indian Space Research organization (ISRO), to create tools and features that assist in the preservation and management of India's cultural heritage.

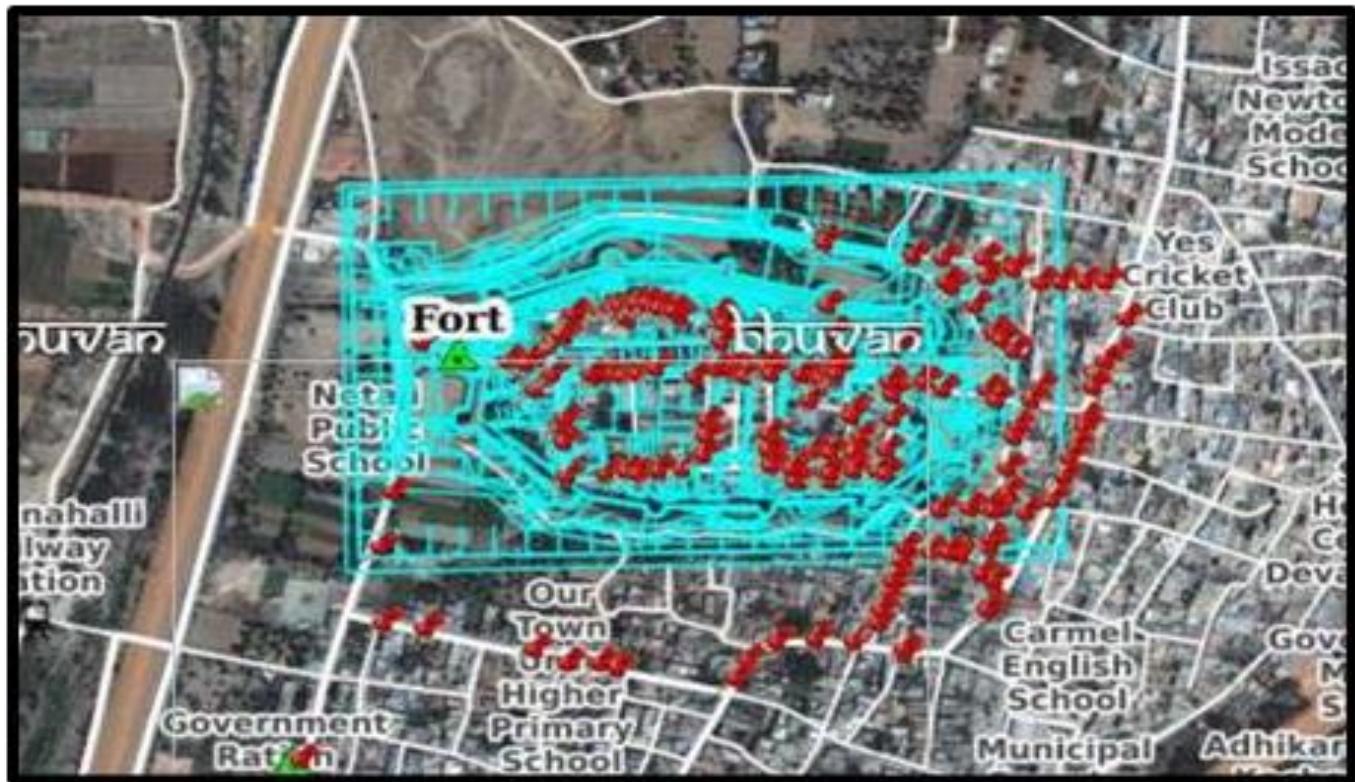
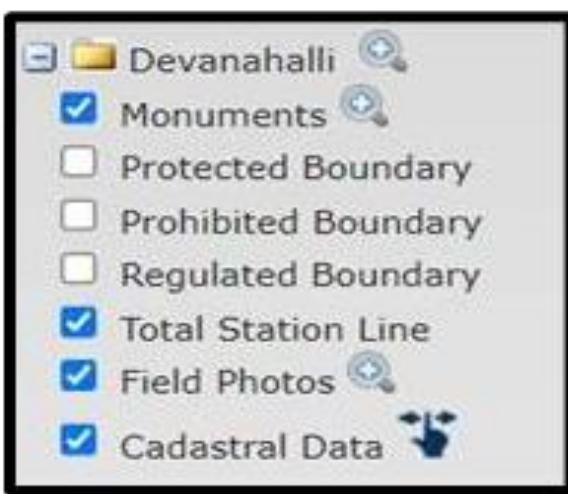
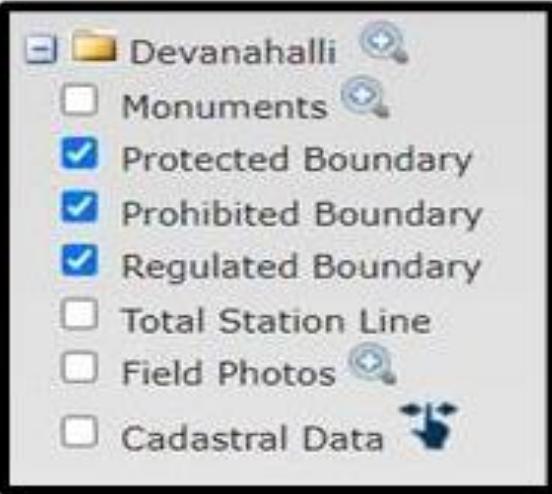
Here are some detailed points about the Archaeological Survey of India Tool in Bhuvan:

- Digital Preservation of Heritage Sites:** The ASI tool in Bhuvan is designed to digitally preserve and document archaeological sites and heritage structures across India. It leverages geospatial technology to capture and store data related to historical monuments.
- Geospatial Data Integration:** The tool integrates geospatial data, including satellite imagery and topographic information, with archaeological data. This

integration aids in the comprehensive mapping and monitoring of heritage sites.

3. **Site Location and Identification:** Users can access Bhuvan's geospatial platform to identify the precise locations of archaeological sites and monuments, making it a valuable resource for researchers, historians, and government agencies.
4. **Conservation and Restoration Planning:** The tool assists in the planning of conservation and restoration efforts for heritage structures. It provides valuable data for experts to develop strategies to preserve and restore these sites.
5. **Tourism Promotion:** By making information about archaeological sites easily accessible, the ASI tool in Bhuvan contributes to the promotion of cultural and heritage tourism. Tourists and history enthusiasts can use this tool to plan visits to these sites.
6. **Monitoring and Protection:** The tool aids in monitoring the condition of heritage sites over time. It can be used for early detection of any potential threats, including encroachments, illegal construction, or natural disasters.
7. **Public Access:** Much of the data and information available through this tool is made accessible to the public. Researchers, students, and the general public can access this resource to learn about India's rich archaeological heritage.
8. **Collaborative Efforts:** The collaboration between ASI and Bhuvan represents a synergistic approach, with ASI's expertise in cultural heritage preservation and Bhuvan's geospatial capabilities working together to safeguard India's historical treasures.

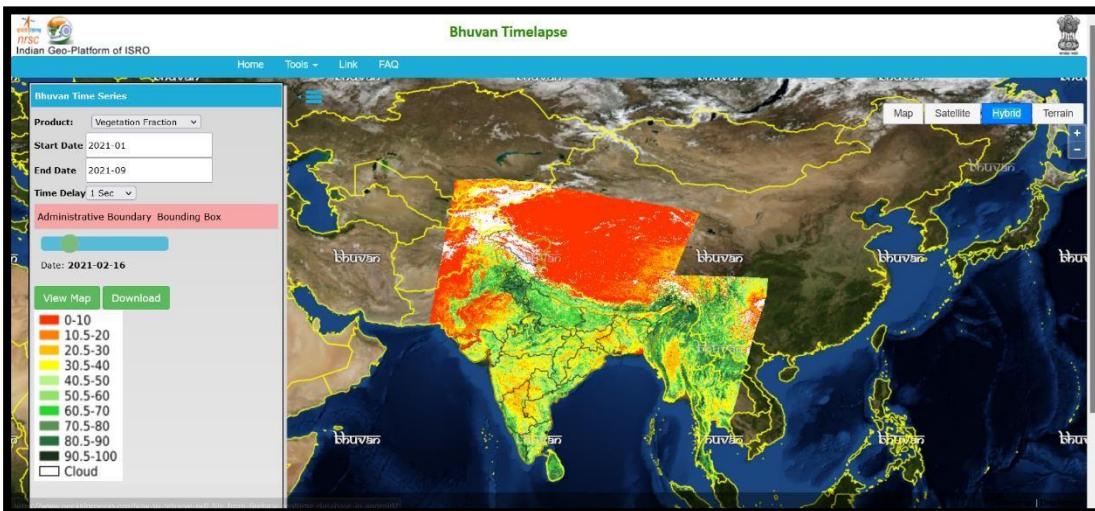
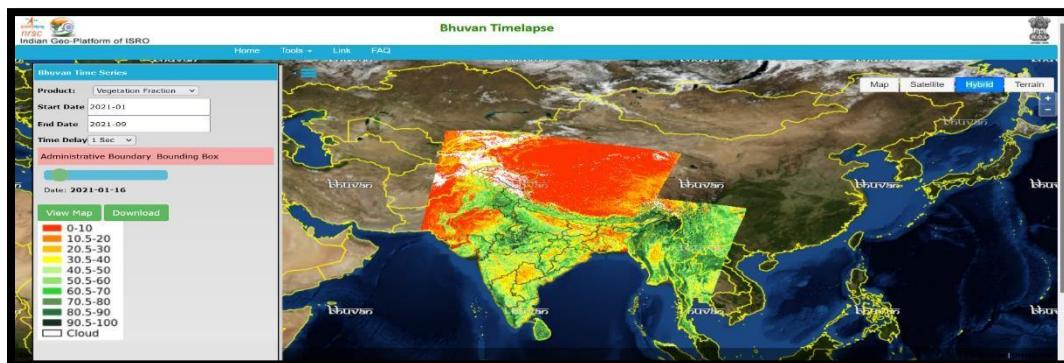
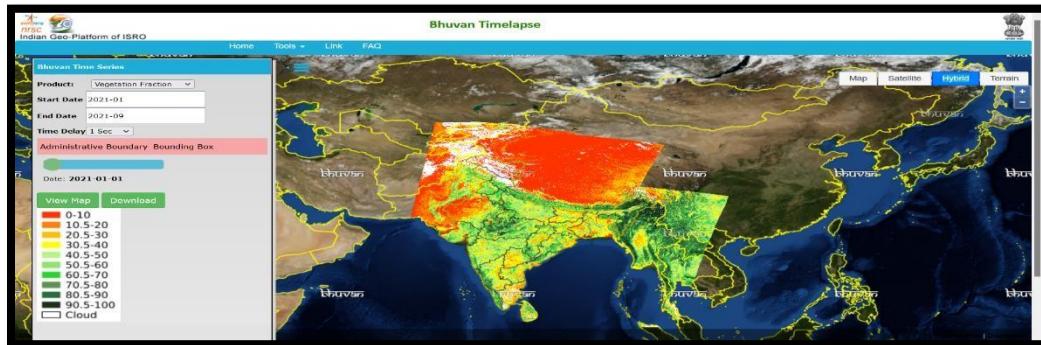


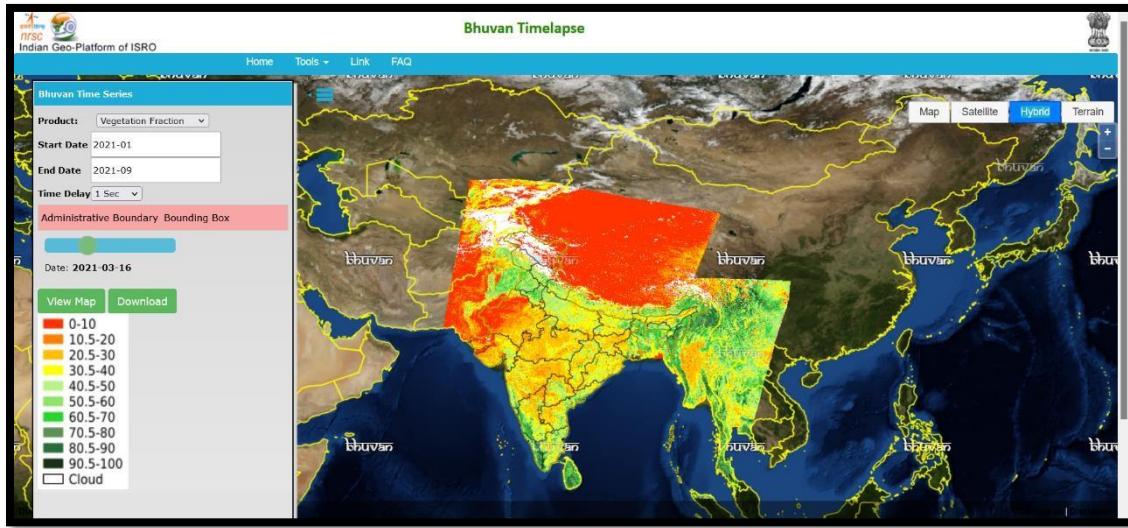


- Chirag:

## 1.Bhuvan Timelapse

- Bhuvan Timelapse is a web application developed by the Indian Space Research Organisation (ISRO) to display satellite imagery in a sequential timelapse format. The application allows users to see changes that have occurred in an area over a period of time, ranging from a few years to several decades.
- We can find this feature under **Bhuvan Central Applications -> Special Applications**.
- Below is the **VEGETATION FRACTION** pictures by time-lapse feature.





## 2. Thematic Services

- Thematic Services of Bhuvan are a set of services that provide users with access to thematic data and information about different regions of India and the world. Thematic data is geospatial data that is classified or grouped according to a specific theme, such as land use, land cover, vegetation, or water resources.
- Thematic services are offered by the National Remote Sensing Centre (NRSC), which is a part of the Indian Space Research Organisation (ISRO). Thematic services are available to anyone who has an internet connection.

Bhuvan-Thematic Services facilitate the users to select, browse and query the Thematic Datasets from this portal. Users can consume these Thematic Datasets and integrate into their systems as OGC Web Services.

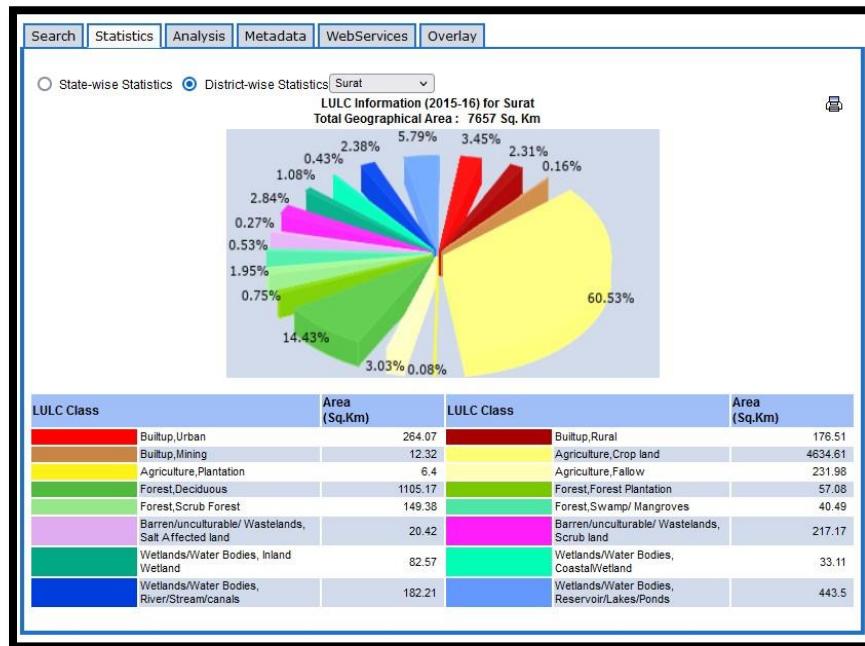
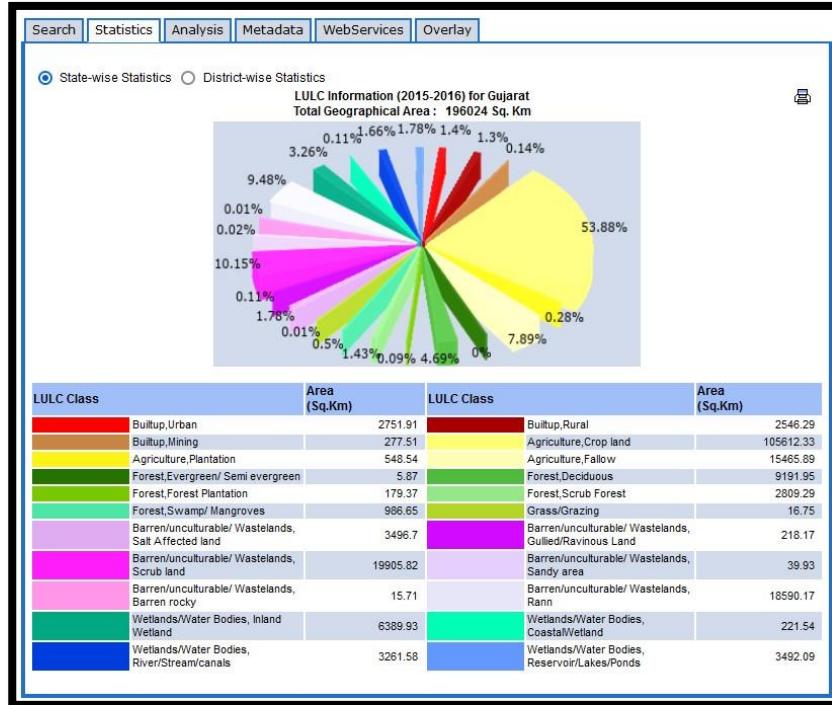
Search   Statistics   Analysis   Metadata   WebServices   Overlay

Select Theme   Land Use Land Cover(50K):2015-16

Select State   GUJARAT

1. Technical document    [\*\*View\*\*](#)

2. Map    Statistics



## I. Data Identification Information

1	Name of the Dataset	Gujarat
2	Theme	Landuse landcover 2015-2016
3	Keywords	Landuse landcover, 50K, GUJARAT , NRSC, ISRO

4	Access Constraints	As per NRSC Data Dissemination Policy
5	Use Constraints	As per NRSC Data Dissemination Policy
6	Purpose of creating data	To generate digital wasteland database for Ministry Rural Development, Government of India
7	Data Type	Vector data
8	Edition	First
9	Status	Completed

### **3. Archaeological Survey of India [Tourism]**

- The Archaeological Survey of India (ASI) Tourism Bhuvan portal is a web-based application that provides users with access to information about archaeological sites and monuments in India. The portal is developed by the Indian Space Research Organisation (ISRO) and is hosted on the Bhuvan platform.
- The ASI Bhuvan feature provides users with the following capabilities:
- **Interactive map viewer:** The portal includes an interactive map viewer that allows users to browse and search for archaeological sites and monuments in India. The map viewer also provides information about the location, type, and history of each site.
- **3D models:** The portal includes 3D models of some of the most popular archaeological sites and monuments in India. These models allow users to explore the sites in detail and get a better understanding of their structure and layout.
- **Virtual tours:** The portal includes virtual tours of some of the most popular archaeological sites and monuments in India. These tours allow users to explore the sites without having to travel to them physically.
- **Information about tourism facilities:** The portal provides information about tourism facilities, such as hotels, restaurants, and transportation, near archaeological sites and monuments.

Enter City or Lat,Lon(ex:chennai or :

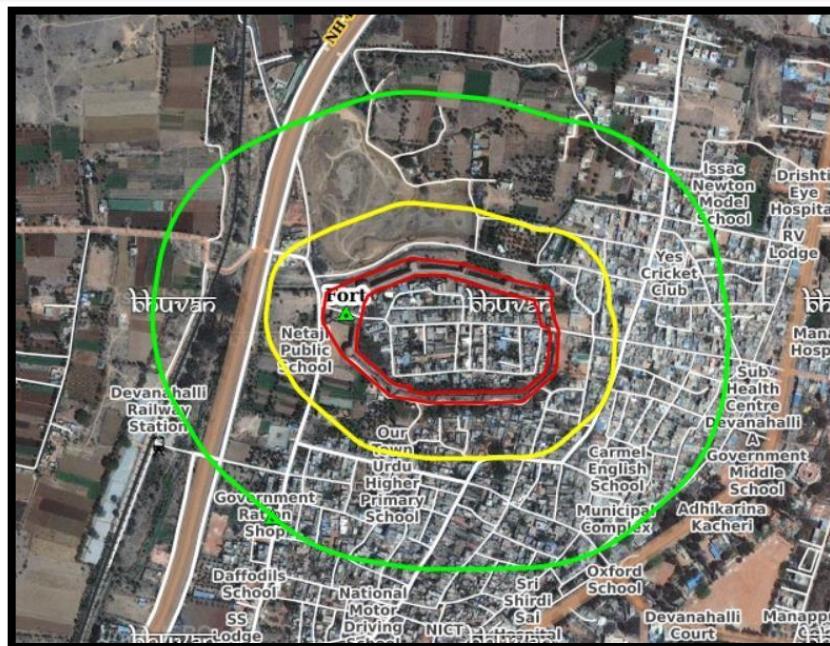
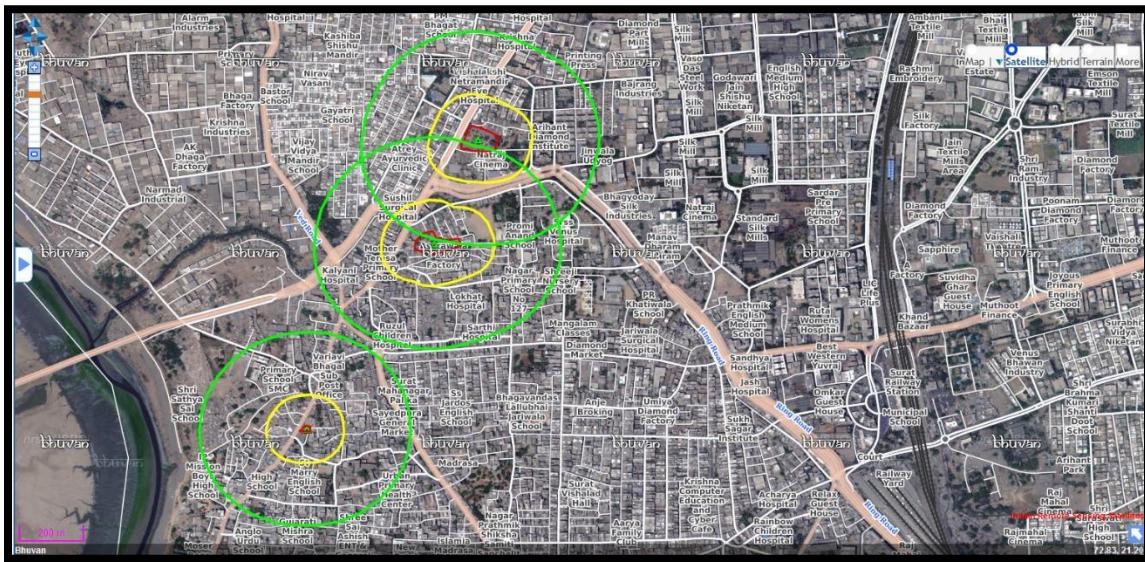
**All India Inventory of Sites and Monuments**

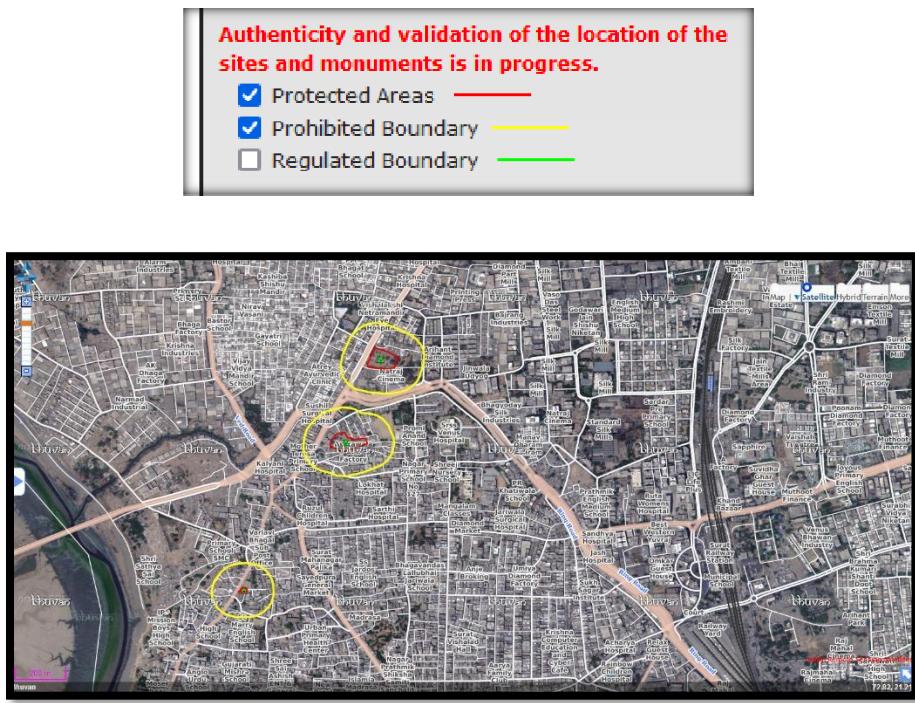
Select State  Gujarat

Select Circle  Vadodara Circle

Select District  Surat

Monument





## 4. Near Real Time Flood Monitoring

The Near Real Time Flood Monitoring service of Bhuvan is a web-based application that provides users with access to near real time data and information about floods. The service is developed by the Indian Space Research Organisation (ISRO) and is hosted on the Bhuvan platform.

The Near Real Time Flood Monitoring service provides the following features:

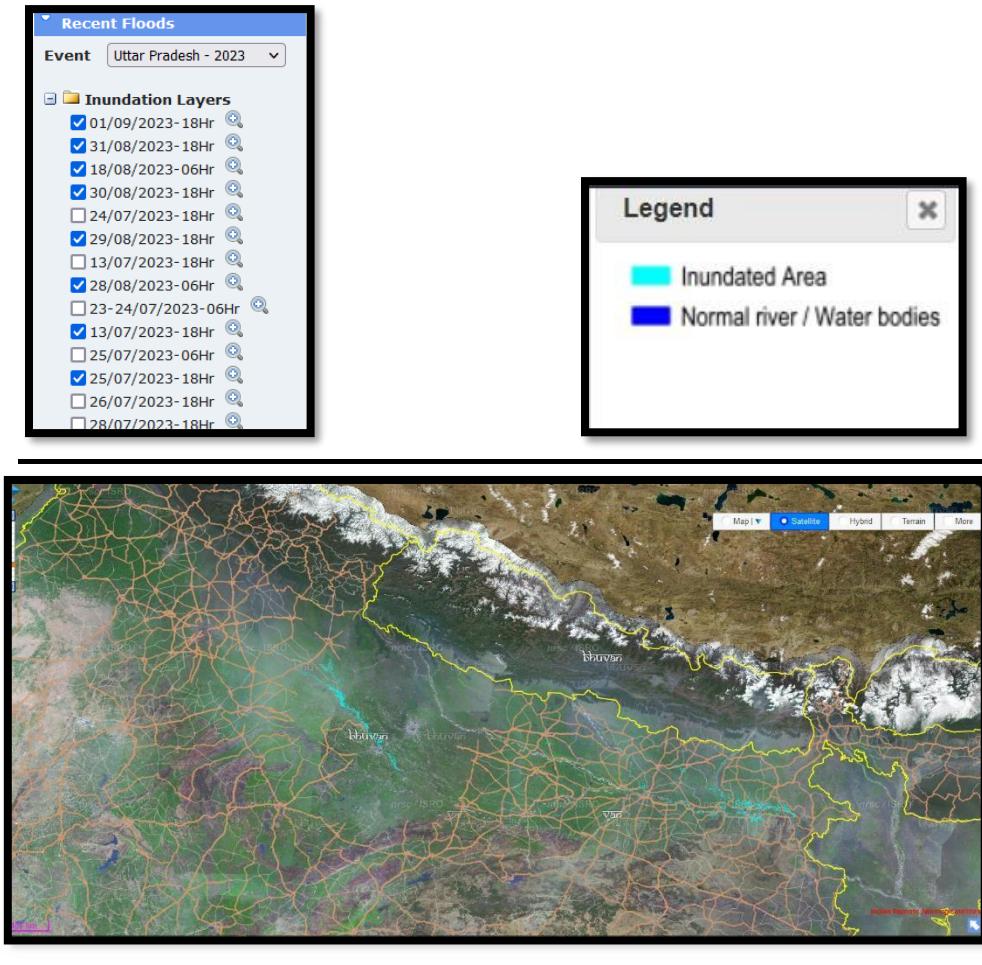
- **Interactive map viewer:** The service includes an interactive map viewer that allows users to track the extent of flooding in near real time. The map viewer also provides information about the depth of the flood, the expected flood inundation area, and the potential impact of the flood.
- **Satellite imagery:** The service provides access to satellite imagery of floods. This imagery can be used to assess the damage caused by the flood and to track the movement of the flood waters.

Bhuvan Near Real Time Flood Monitoring service interactive map viewer

Bhuvan Near Real Time Flood Monitoring service satellite imagery of Assam floods 2022

- **Flood warnings and advisories:** The service provides users with access to flood warnings and advisories issued by the Central Water Commission (CWC). These warnings and advisories can be used to stay informed about the latest developments related to the flood and to take necessary precautions.

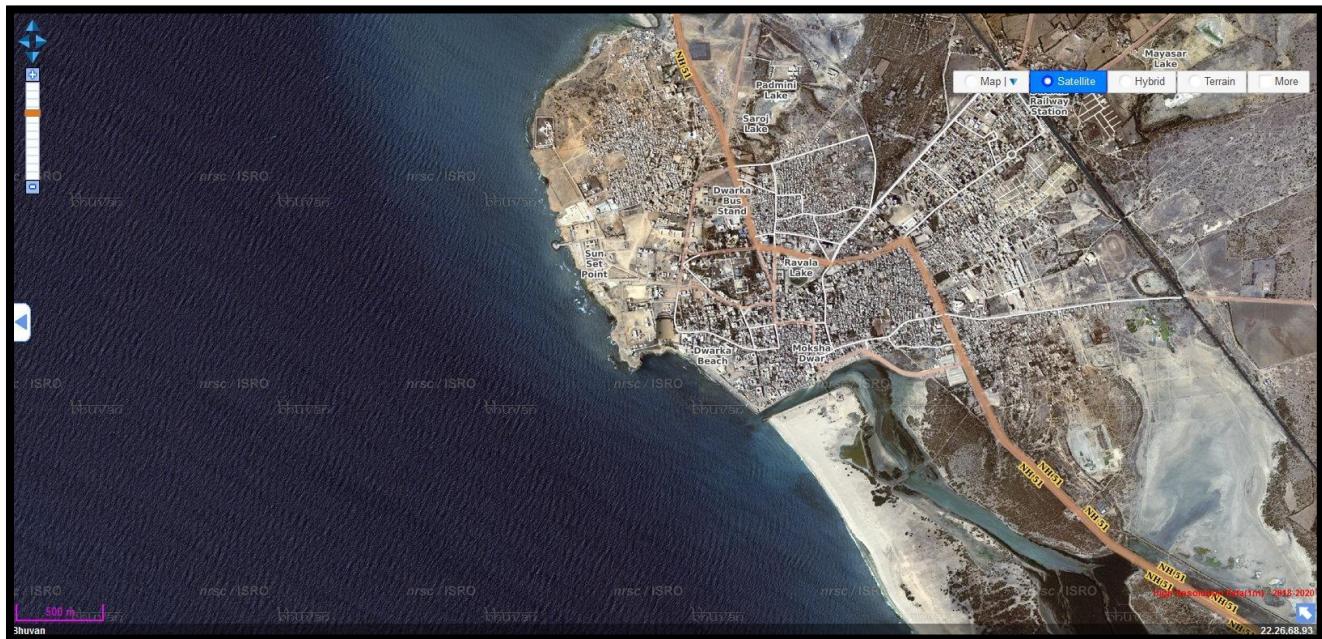
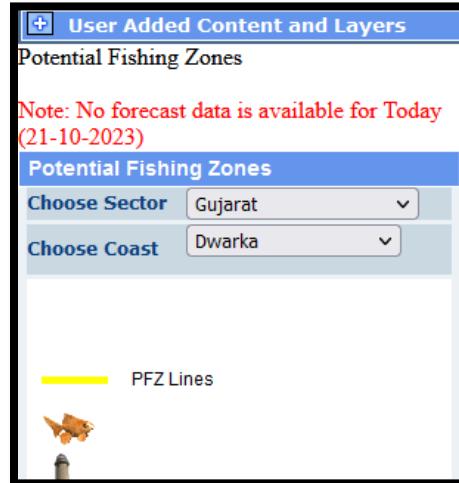
The Near Real Time Flood Monitoring service is a valuable resource for government agencies, disaster management agencies, and the general public. The service can be used to track the extent of floods, assess the damage caused by floods, and stay informed about the latest developments related to floods.



## 5. Ocean Services

The Ocean Services of Bhuvan provide users with access to a variety of data and information about the oceans, including:

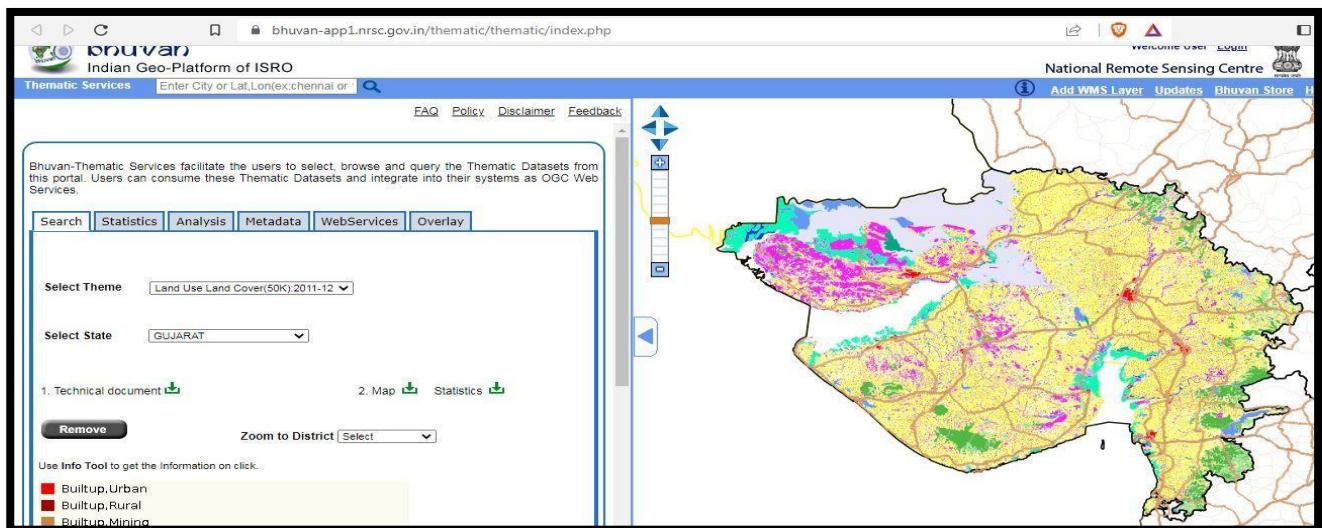
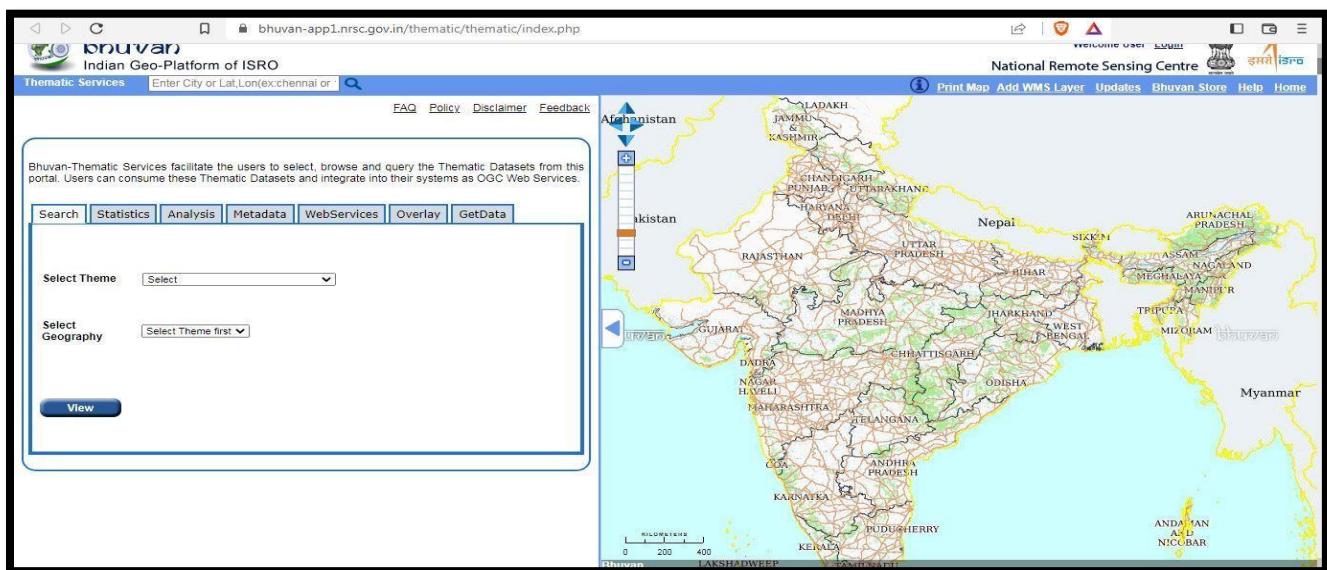
- **Satellite imagery:** Bhuvan provides access to satellite imagery of the oceans, which can be used to monitor changes in sea surface temperature, sea level, and ocean currents.
- **In situ data:** Bhuvan provides access to in situ data from buoys and other ocean observing platforms. This data can be used to monitor real-time conditions in the oceans.
- **Ocean models:** Bhuvan provides access to ocean models, which can be used to predict future ocean conditions.

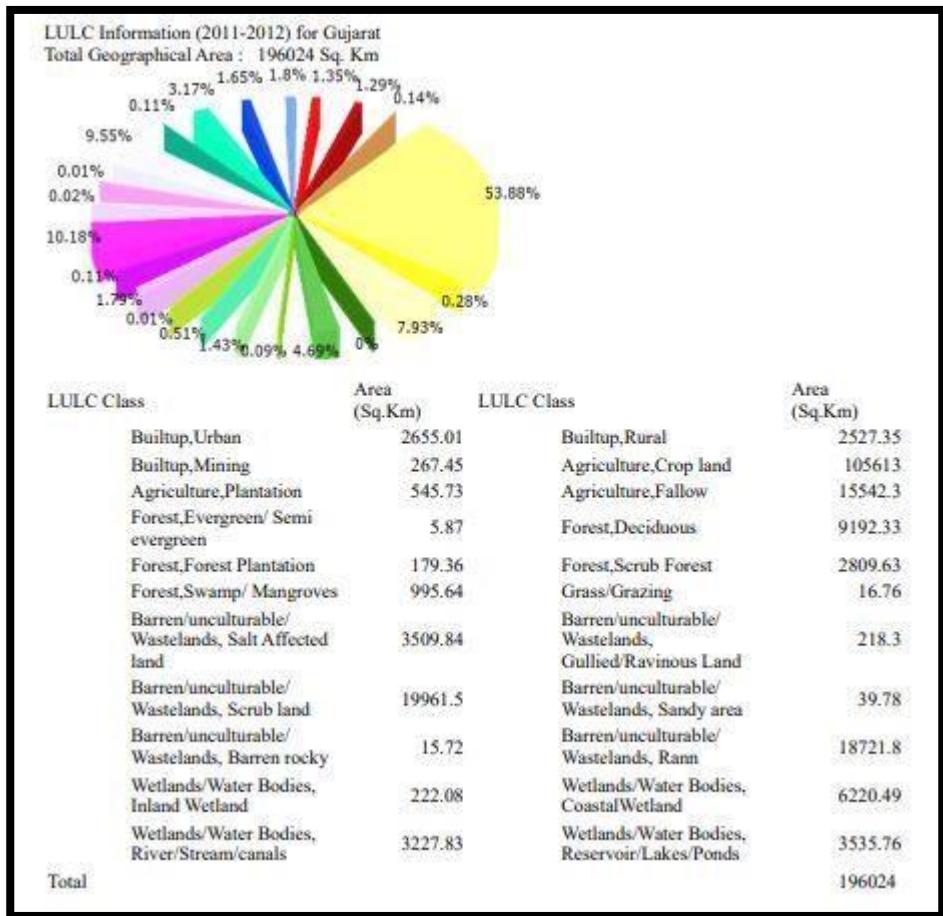


- Dev:

## 1. Thematic Services:

- Thematic Layers For Land Use Land Cover Data, Urban Land Use, Waste Land, Glacial Lake Water Bodies, Geomorphology, Lineament, Flood Hazard, Flood Annual Layers, Erosion, Salt Effected And Water Logging, Water Bodies And Urban Sprawl Are Available For Visualization On This Link. All These Layers Have The Provision To Be Accessed As Wms Service Through Various Clients Like Openlayers, Qgis, Arcgis Etc. These Services Can Also Be Linked To Website In Internet Or Local Area Network. These Thematic Layers Are Available Only On Bhuvan For India And This Makes Bhuvan Unique.





FAQ Policy Disclaimer Fee

[Search](#) [Statistics](#) [Analysis](#) [Metadata](#) [WebServices](#) [Overlay](#)

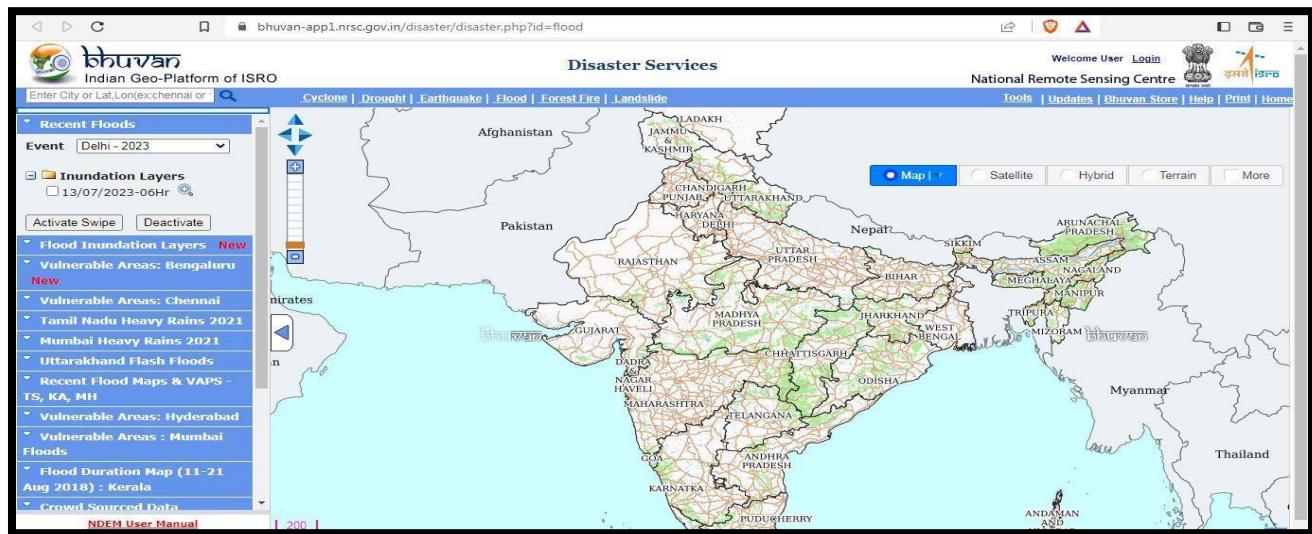
Metadata of the State: GUJARAT

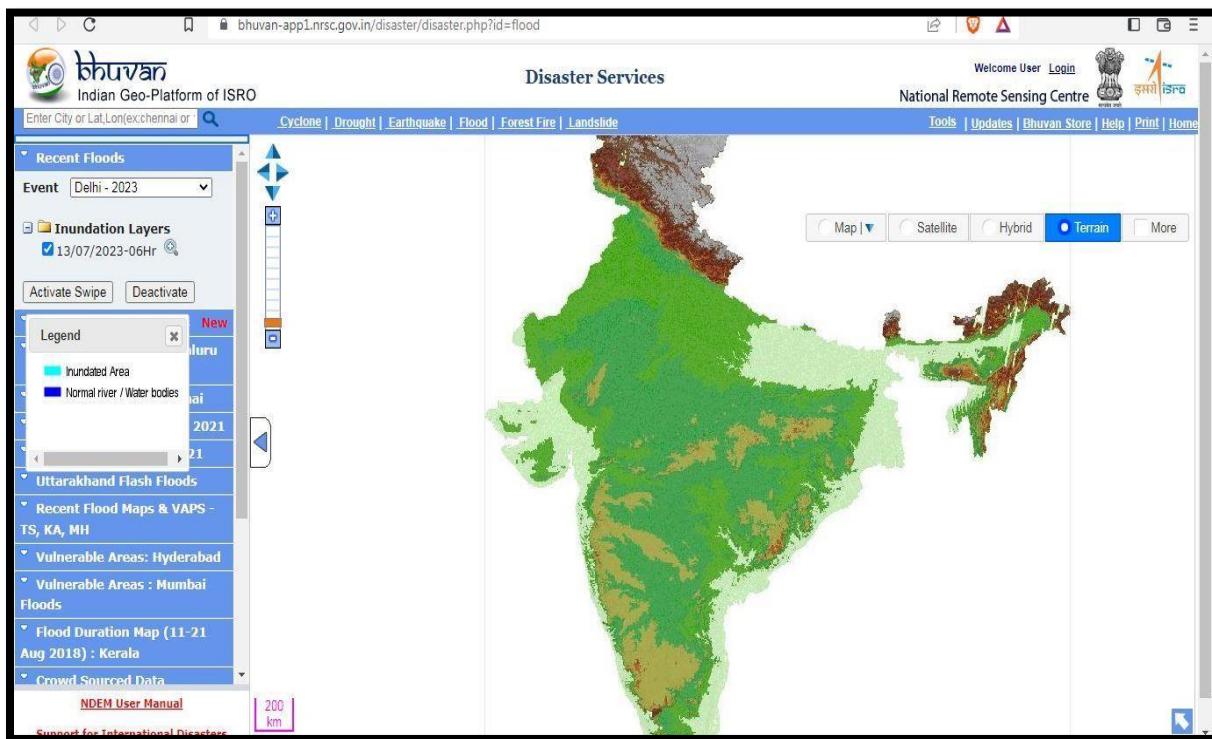
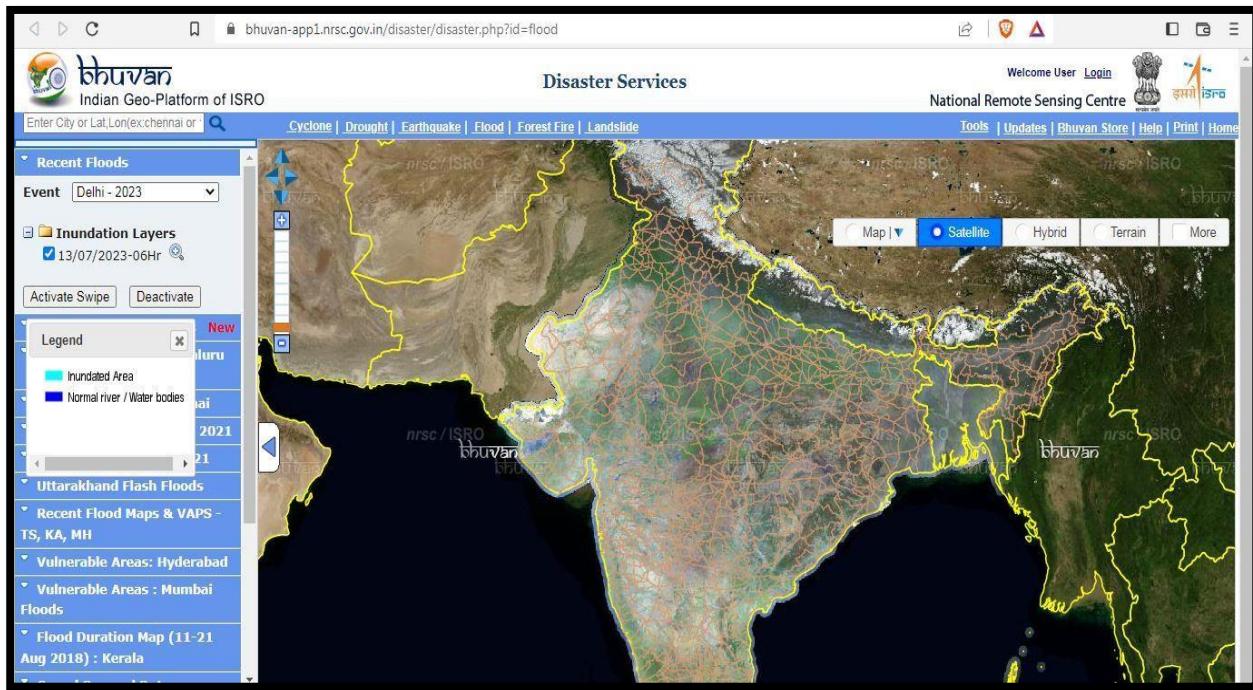
**I. Data Identification Information**

1. Name of the Dataset	GUJARAT
2. Theme	Land Use Land Cover
3. Keywords	LULC, 50K, GUJARAT , NRSC, ISRO, Thematic Services, Bhuvan
4. Access Constraints	As per NRSC Data Dissemination Policy
5. Use Constraints	As per NRSC Data Dissemination Policy
6. Purpose of creating data	To generate digital land use/land cover database
7. Data Type	Vector data
8. Edition	First
9. Status	Completed

## **2. Disaster Management Support Services :**

- Disaster Management Support Programmed , Decision Support Centre is established at NRSC for monitoring natural disasters viz. flood, cyclone, agricultural drought, landslides, earthquakes and forest fires in near real-time using space and aerial remote sensing based inputs.
- National Database for Emergency Management (NDEM) serves as national repository of GIS based database for entire country coupled with set of Decision Support System tools to assist the State / Central Disaster Management Authorities in decision making during emergency situations.



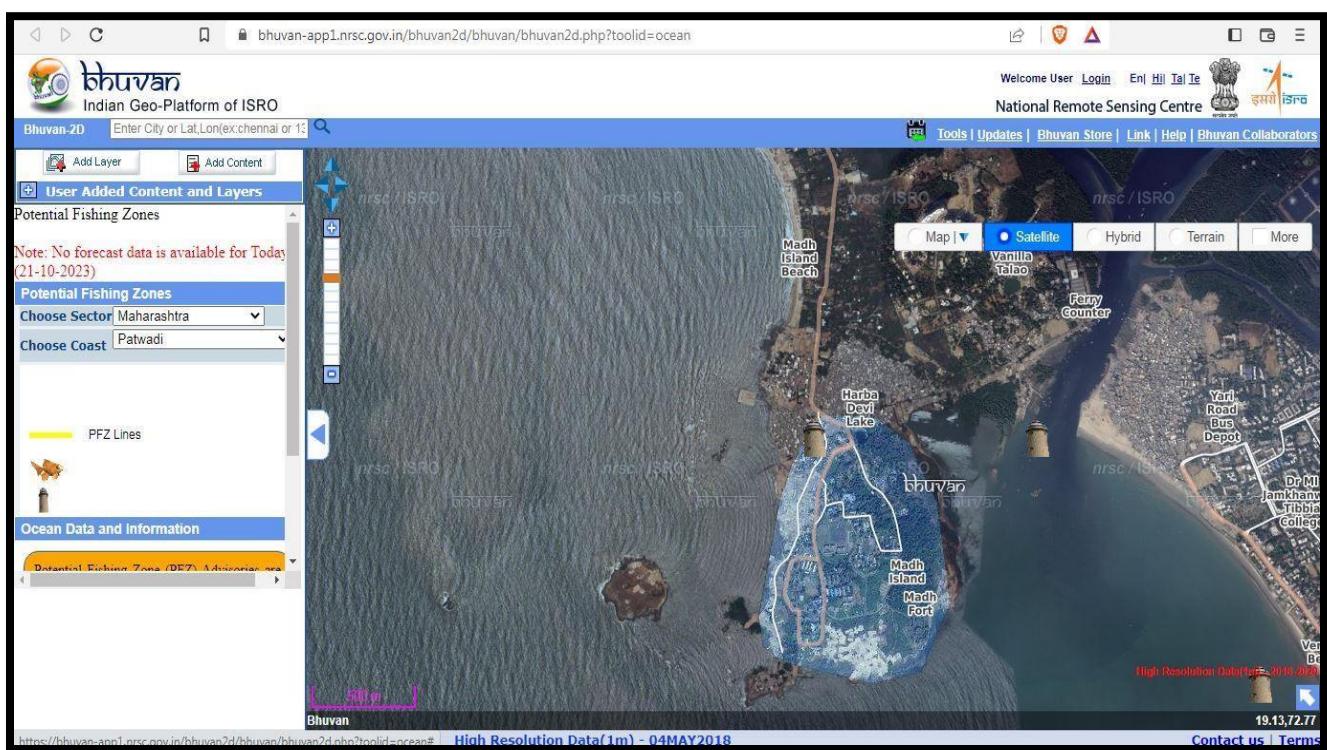
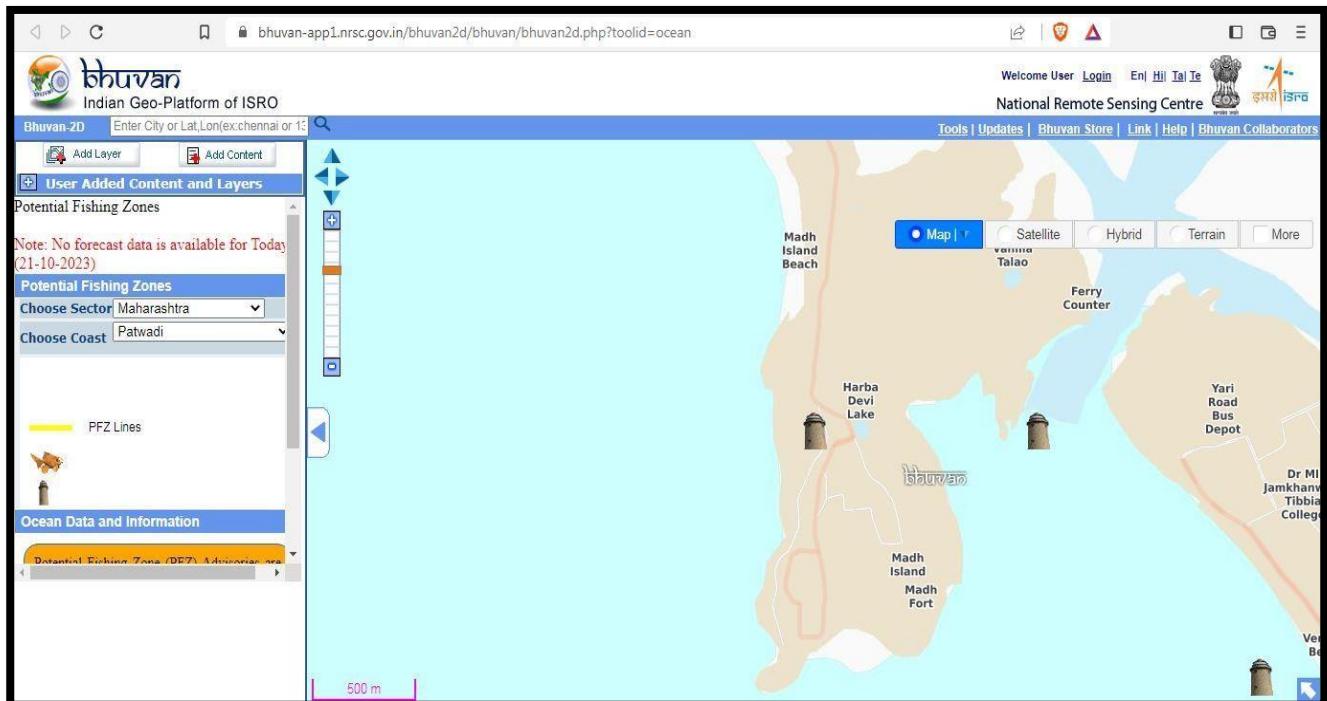


### **3. Ocean Services:**

- This functionality provides Potential Fishing Zone (PFZ) advisories and information on sea, derived from the satellite imagery. It gives you two drop down boxes for the selection of coastal states and the corresponding fishing zones.

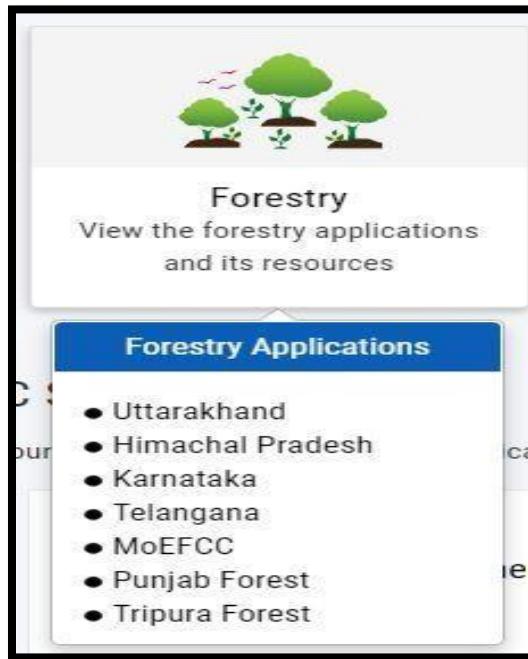


Screenshot of the Bhuvan-2D interface showing the "Ocean Services" tool. The map displays coastal states of India with PFZ lines overlaid. A legend indicates "PFZ Lines" in yellow. A note on the left states: "Note: No forecast data is available for Today (21-10-2023)". A tooltip for "Potential Fishing Zone (PFZ) Advisories" explains they are generated using Sea Surface Temperature (SST) and Chlorophyll derived from satellite imagery to serve the Fishing Community to increase catch per unit effort. The map shows state boundaries and major cities like Mumbai, Bangalore, Hyderabad, and Chennai.



#### **4. Uttarakhand Forest:**

- Salient Features
- Collaborator-Department of Forest, Uttarakhand
- Portal provides forest fire alerts, administrative forest boundaries, climate vulnerability, wildlife related data for visualization
- Application URL: [https://bhuvan-app1.nrsc.gov.in/uk\\_forest/](https://bhuvan-app1.nrsc.gov.in/uk_forest/)



**Uttarakhand Forest**

Enter City or Lat,Lon(ex:chennai or 13)

Tools | Link | Home

Welcome User Login

Map | Satellite Hybrid Terrain More

Indian Remote Sensing Satellite

Bhuvan

74.63, 32.36

**Know your Forest**

Circle Choose ...

Division Select Circle First

Range Select Division First

Block Select Range First

Beat Select Block First

**View**

Land Use Land Cover 50K 2005-06  
 Land Use Land Cover 50K 2011-2012  
 Wasteland 50K 2008-09  
 Geomorphology 50K 2005-06  
 Lineament 50K 2005-06  
 Weather Information

**Fire Management**

**Asset Management**

**Eco-Tourism**

**Wild Life Management**

**Namami Gange Project**

**Departmental Maps**

**Uttarakhand Forest**

Enter City or Lat,Lon(ex:chennai or 13)

Tools | Link | Home

Welcome User Login

Map | Satellite Hybrid Terrain More

Indian Remote Sensing Satellite

Bhuvan

79.25, 32.27

**Know your Forest**

Circle Yamuna Circle X

Division Tons Forest Division X

Range Devta Range X

Block Begal X

Beat Kukreda Beat X

**Remove**

Land Use Land Cover 50K 2005-06  
 Land Use Land Cover 50K 2011-2012  
 Wasteland 50K 2008-09  
 Geomorphology 50K 2005-06  
 Lineament 50K 2005-06  
 Weather Information

**Fire Management**

**Asset Management**

**Eco-Tourism**

**Wild Life Management**

**Namami Gange Project**

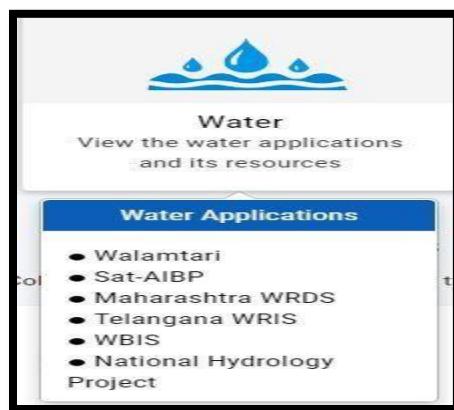
Discussion Forum | Send Mail | Legend

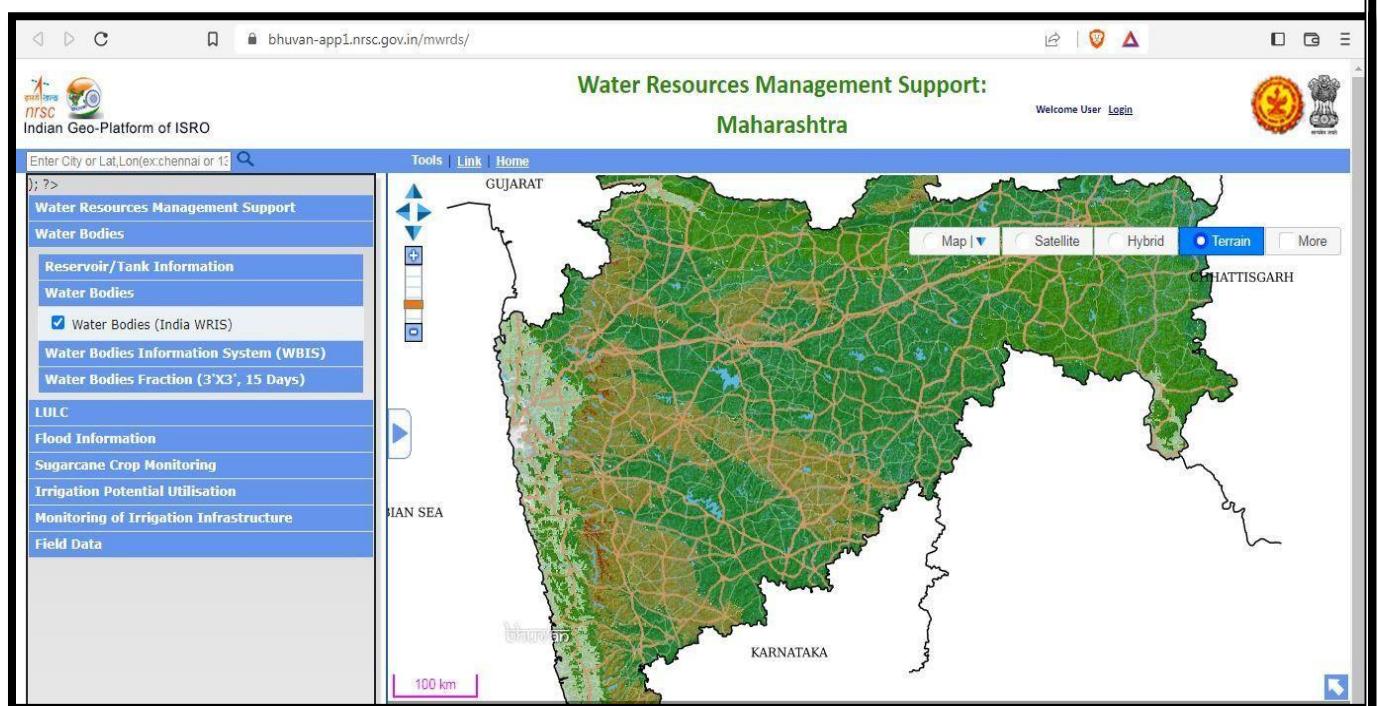
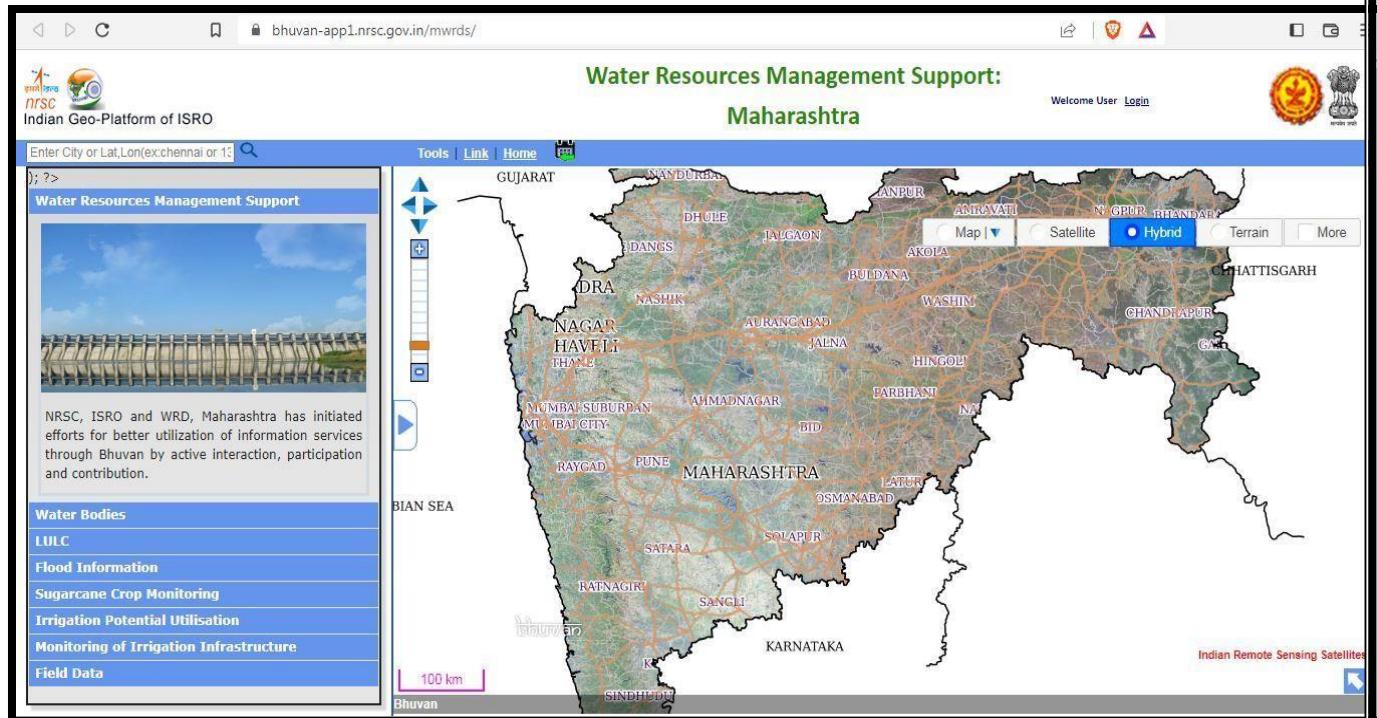
Contact us | About us | Disclaimer

The screenshot shows the Bhuvan-APP1.nrcs.gov.in/uk\_forest/ interface. At the top, there's a search bar with 'Enter City or Lat,Lon(ex:chennai or 13)' and a magnifying glass icon. The title 'Uttarakhand Forest' is centered above the map. On the right, there are links for 'Welcome User' and 'Login'. The map itself shows a forested area with a green polygon drawn over it, likely indicating a specific study area. The bottom right corner of the map displays 'Indian Remote Sensing Satellites' and coordinates '79.46, 29.18'. The left sidebar has several sections: 'Know your Forest' (with dropdowns for Circle, Division, Range, Block, Beat), 'Remove' button, and a list of checkboxes for various datasets; 'Fire Management', 'Asset Management', 'Eco-Tourism', 'Wild Life Management', and 'Namami Gange Project'.

## 5. Water Resources Management:

- Bhuvan acts as a platform for management of water resources nationwide by providing more than 20 ministry portals and 30 state portals; besides active support for flagship programmes of the government such as Integrated Watershed Development Program (Srishti-Drishti) and National Mission for Clean Ganga.





- **Avush:**

## 1.Ocean Services

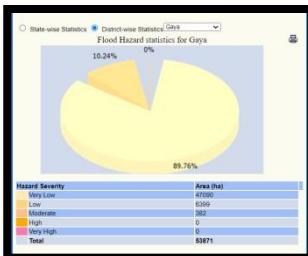
The Ocean Services of Bhuvan provide users with access to a variety of data and information about the oceans, including:

- **Satellite imagery:** Bhuvan provides access to satellite imagery of the oceans, which can be used to monitor changes in sea surface temperature, sea level, and ocean currents.
- **In situ data:** Bhuvan provides access to in situ data from buoys and other ocean observing platforms. This data can be used to monitor real-time conditions in the oceans.
- **Ocean models:** Bhuvan provides access to ocean models, which can be used to predict future ocean conditions.



## 2.Thematic Services

- The Bhuvan GIS tool provides a variety of resources that can be used to assess flood hazard in India. These resources include:
- **Flood hazard maps:** Bhuvan provides flood hazard maps for India at different scales. These maps show the areas that are most at risk of flooding.
- **Flood risk assessment tools:** Bhuvan provides tools that can be used to assess the risk of flooding in a particular area. These tools take into account factors such as topography, rainfall, and land use.
- **Flood monitoring data:** Bhuvan provides data on flood events, such as the location, intensity, and duration of floods.



### 3.Tourism

- The Archaeological Survey of India (ASI) Tourism Bhuvan portal is a web-based application that provides users with access to information about archaeological sites and monuments in India. The portal is developed by the Indian Space Research Organisation (ISRO) and is hosted on the Bhuvan platform.
- The ASI Bhuvan feature provides users with the following capabilities:
- **Interactive map viewer:** The portal includes an interactive map viewer that allows users to browse and search for archaeological sites and monuments in India. The map viewer also provides information about the location, type, and history of each site.
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- **Information about tourism facilities:** The portal provides information about tourism facilities, such as hotels, restaurants, and transportation, near archaeological sites and monuments.

Enter City or Lat,Lon(ex:chennai or :

All India Inventory of Sites and Monuments

Select State

Select Circle

Select District

Monument

### 4.Bhuvan Timelapse

- In this feature we can see the past data of the particular area that how it is transform over the time and how it is developed and looks over the time from the satellite.
- We can find this feature under **Bhuvan Central Applications -> Special Applications.**

- Below is the ***Kashi Vishwanath Corridor*** pictures by time-lapse feature.



## 5. Near Real Time Cyclone Monitoring

- The Bhuvan GIS tool can be used for near real-time cyclone monitoring in the following ways:
- Satellite imagery:** Bhuvan provides access to satellite imagery from a variety of sources, including the Indian Space Research Organisation (ISRO) and the National Oceanic and Atmospheric Administration (NOAA). This imagery can be used to track the movement of cyclones and to assess the damage they have caused.
- Weather forecasts:** Bhuvan provides access to weather forecasts from the Indian Meteorological Department (IMD). These forecasts can be used to track the predicted path of cyclones and to prepare for their arrival.
- Cyclone tracking models:** Bhuvan provides access to cyclone tracking models from a variety of sources. These models can be used to predict the future movement of cyclones and to estimate their intensity.



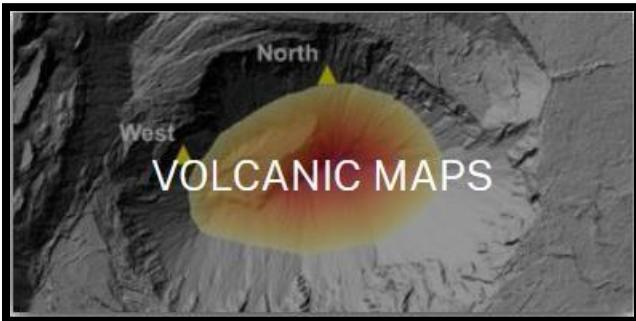
## **Practical-4**

### **Report on data collection from USGS**

- Manan:

## 1. VOLCANIC MAPS

- The USGS Volcano Hazards Program enhances public safety and minimize social and economic disruption from volcanic unrest and eruption. We accomplish this by delivering effective forecasts, warnings, and information about volcano hazards based on scientific understanding of volcanic processes. Learn more by exploring USGS volcanic maps.



- Filters

Filter Total Items: 163

Information Sys ▾ Year ▾ Search

**▼ ADVANCED FILTERS**

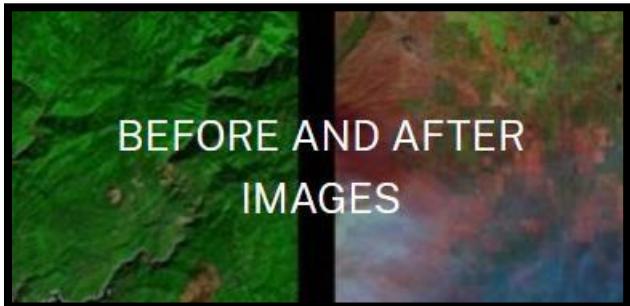
Hawaii ▾ Order ▾

- **January 12, 2021—Kilauea summit eruption thermal map**
- A helicopter overflight on January 12, 2021, at approximately 11:00 a.m. HST allowed for aerial visual and thermal imagery to be collected of the eruption within Halema‘uma‘u crater at the summit of Kīlauea Volcano. Active surface lava is largely limited to the western half of the lake; the eastern portion of the lake has stagnated and is dominated by cooling, solidified crust. The scale of the thermal map ranges from blue to red, with blue colors indicative of cooler temperatures and red colors indicative of warmer temperatures. USGS map by M. Patrick



## **2. Before and After Images**

- The USGS has science based work that often requires the comparison of two geographic areas over time. Though scientific data is critical to understanding changes over time, visually seeing those changes is a powerful tool in support of that data.



- Before Image (September 29, 2021)



- After (October 7, 2021)



- The USGS Hawaiian Volcano Observatory KWcam at Kīlauea's summit has captured changes within Halema‘uma‘u crater, at Kīlauea's summit, due to the eruption that began on September 29, 2021. At approximately 3:21 pm, HST, new fissures opened at the base of Halema‘uma‘u crater. These fissures opened east of the large island near the center of the lava lake that was active within Halema‘uma‘u crater from December 2020 until May 2021.

### **3. Slideshows**

- Explore USGS science conducted told through stories of series of photographs.



- Filters

Filter Total Items: 8

2021  Search

**▼ ADVANCED FILTERS**

Alaska  Order

- **Alaska**
- Coastal Erosion on the north slope of Alaska
- Aerial view southwest of the actively erupting cone within Veniaminof caldera.
- Caribou grazing along the Dalton Highway, Alaska



#### 4. Stereograms

- The USGS has a rich historical photographic library containing photography from the late 1800s during the exploration of the West. A subset of this photography was the capturing of stereograph images (two images side by side). The USGS has implemented a method based

off of a NYPL open source project (Stereogramator) to bring together stereograph images into 3D-like animated GIFs.



- Yellowstone National Park, Wyoming. Camp scene. Steve Hovey, "wagon boss." U.S. Geological and Geographical Survey of the Territories (Hayden Survey). Stereoscopic view.



- Church in Chihuahua, Mexico. No date. (Stereoscopic view) from the USGS Denver Library Photographic Collection.

## 5. Webcams

---

- The USGS maintains a variety of webcams across the U.S. These webcams provide valuable research information and data to the USGS scientists, the National Weather Service, emergency managers, and area residents to evaluate near, real-time conditions during natural hazard events (most webcams refresh every 5 - 20 minutes).



- Filters

Filter Total Items: 19

Static ▾ 2022 ▾ Search

▼ ADVANCED FILTERS ▾

A screenshot of a web-based filtering interface. At the top, it says "Filter Total Items: 19". Below that are two dropdown menus: one for "Static" and one for the year "2022". To the right of the dropdowns is a search bar with a magnifying glass icon. Below these controls is a button labeled "ADVANCED FILTERS" with a downward arrow icon. The entire interface is enclosed in a black border.

- Webcam at stream gage at Little Menominee River near Frei Stadt, Wisconsin.



- Webcam at USGS Stream gage 01380450 Rockaway River at Main St. at Boonton, NJ.



- **Maharshi:**

## **The United States Geological Survey (USGS)**

The United States Geological Survey (USGS) is a preeminent source of geospatial data and information, playing a vital role in the collection and dissemination of earth science data. USGS offers a variety of unique tools for data collection and analysis.

### **1. Earth Explorer:**

Earth Explorer is a powerful tool for accessing a wide range of remote sensing and satellite data.

Here are some of the features of the Application from USGS:

- **Data Access:** Earth Explorer is a web-based tool that grants access to a vast repository of remote sensing and satellite data, including Landsat, MODIS, and more.
- **Data Search and Retrieval:** It allows users to search for specific data based on criteria such as geographic location, date, and data type.
- **Imagery Download:** Researchers and professionals can download imagery for their projects, making it a critical resource for environmental monitoring, land use analysis, and disaster response.
- **Customization:** Users can customize their search parameters to refine the data selection for their particular research needs.
- **Metadata Access:** Detailed metadata associated with each dataset is available, ensuring data integrity and traceability.

## 1. Enter Search Criteria

To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the [help documentation](#)), and/or choose a date range.

[Geocoder](#) [KML/Shapefile Upload](#)

### Select a Geocoding Method

Feature (GNIS)

**Search Limits:** The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.

[US Features](#) [World Features](#)

### Feature Name

(use % as wildcard)

### Country

All

### Feature Class

All

### Feature Type

All

[Show](#) [Clear](#)

EarthExplorer

[Help](#) [Feedback](#) [Login](#)

[Search Criteria](#)

[Data Sets](#)

[Additional Criteria](#)

[Results](#)

## 1. Enter Search Criteria

To narrow your search area: type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the [help documentation](#)), and/or choose a date range.

[Geocoder](#) [KML/Shapefile Upload](#)

### Select a Geocoding Method

Feature (GNIS)

**Search Limits:** The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.

[US Features](#) [World Features](#)

### Feature Name

(use % as wildcard)

### State

All

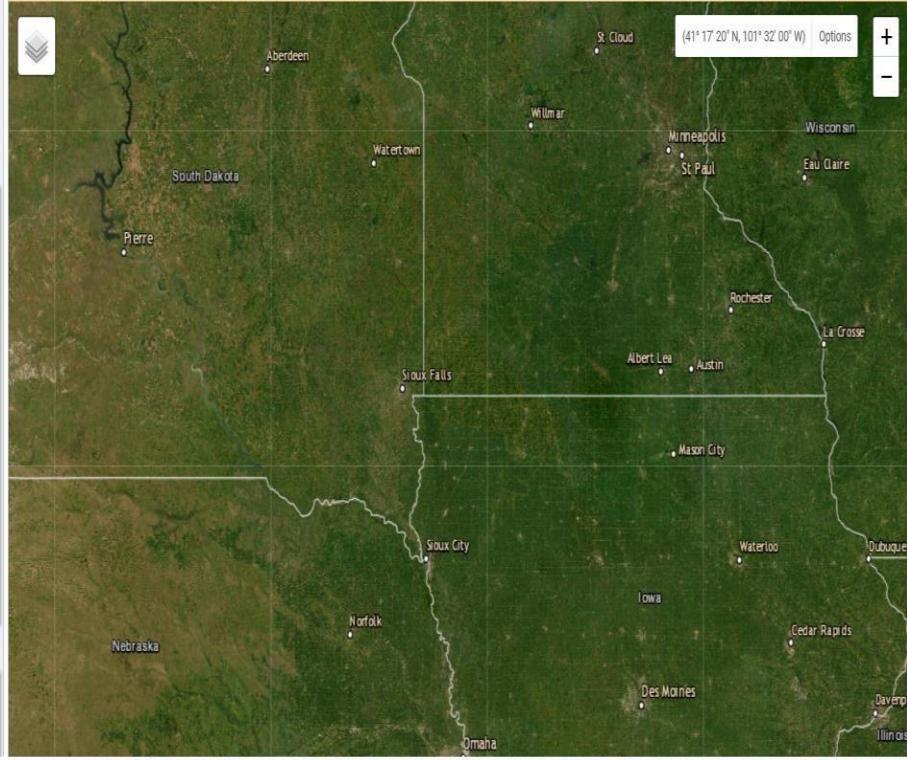
### Feature Type

All

[Show](#) [Clear](#)

[Clear Search Criteria](#)

Search Criteria Summary (Show)



Search Criteria Data Sets Additional Criteria Results

1. Enter Search Criteria

To narrow your search area, type in an address or place name, enter coordinates or click the map to define your search area (for advanced map tools, view the help documentation), and/or choose a date range.

Geocoder KML/Shapefile Upload

Select a Geocoding Method  
Feature (GNIS)

Search Limits: The search result limit is 100 records; select a Country, Feature Class, and/or Feature Type to reduce your chances of exceeding this limit.

US Features World Features

Feature Name  
(use % as wildcard)

State  
All

Feature Type  
All

Show Clear

Click on a Feature to show the location on the map and add coordinates to the Area of Interest Control.

Placename	Type	Region	Latitude	Longitude
54208	ZIP CODE	WISCONSIN	44.3616	-87.8138
54209	ZIP CODE	WISCONSIN	45.0202	-87.2716
54210	ZIP CODE	WISCONSIN	45.2597	-87.0435
54211	ZIP CODE	WISCONSIN	45.1565	-87.1668

Search Criteria Summary (Show) Clear Search Criteria

(39° 25' 26" N, 116° 33' 48" W) Options + -

## 2. National Map:

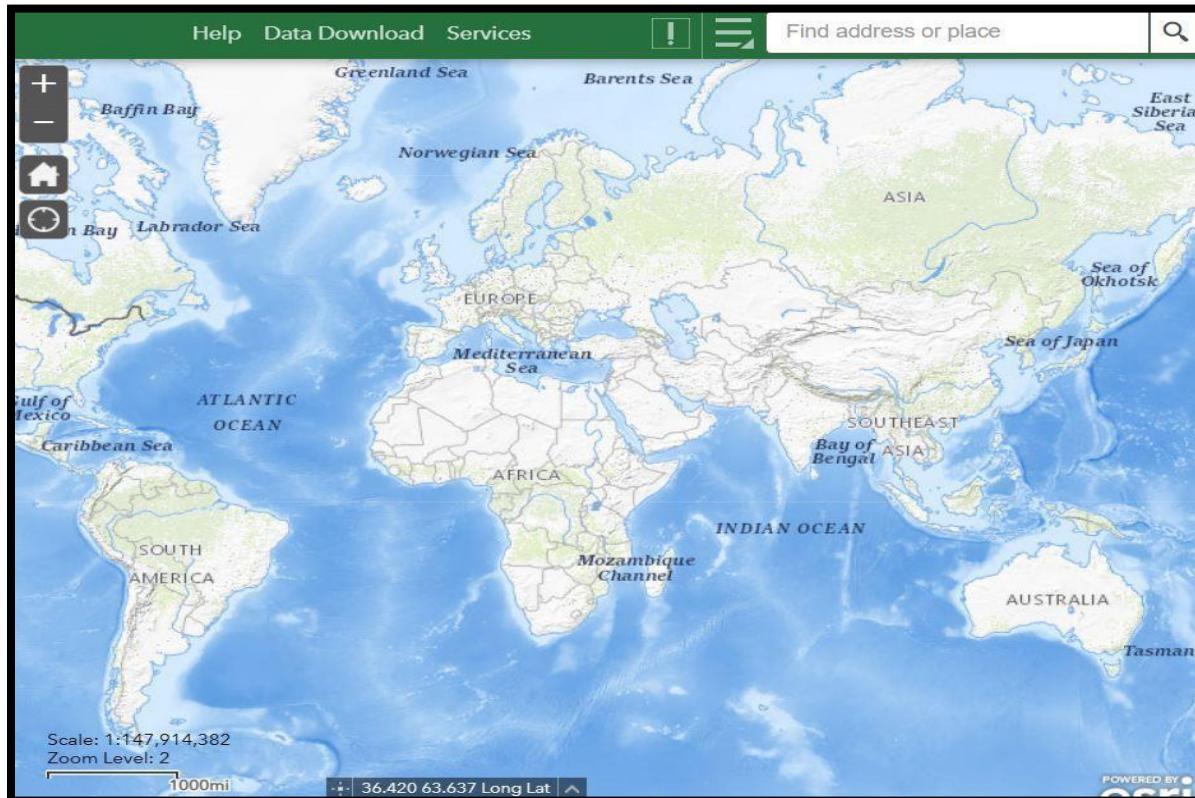
The National Map is an extensive source for geospatial data, topographic maps, and elevation data.

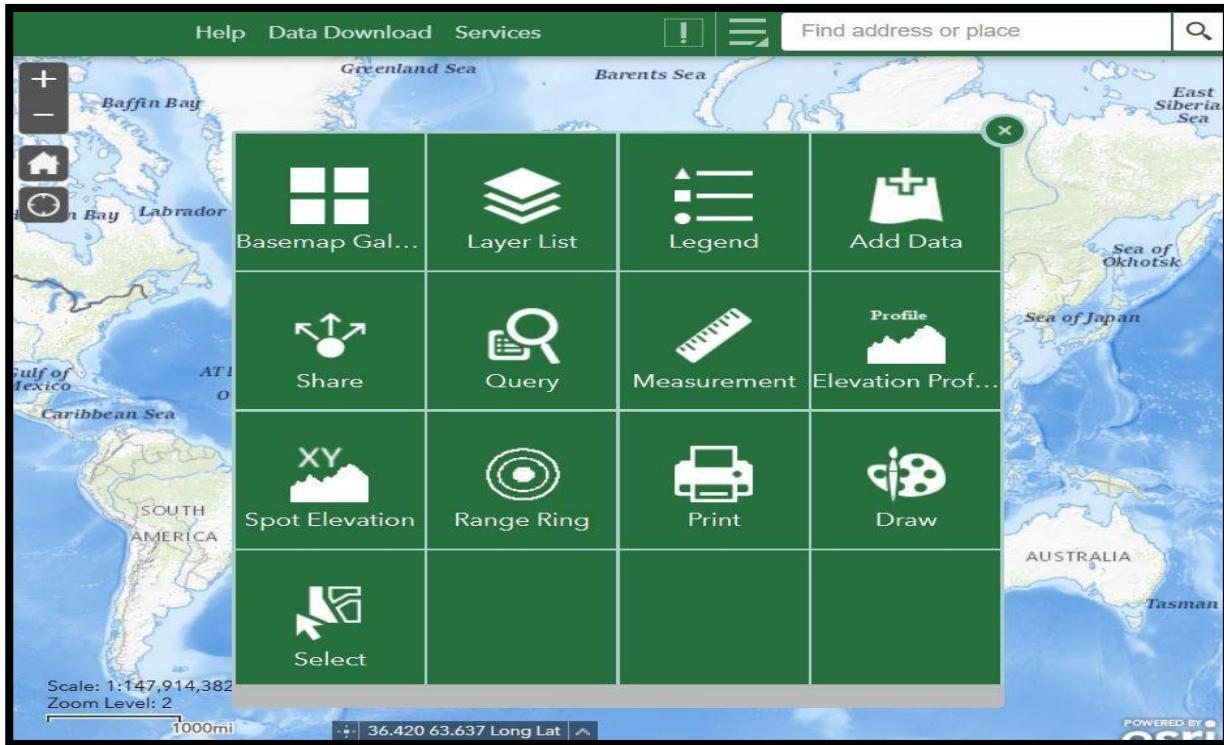
**Unique Feature:** It offers an interactive platform that allows users to customize maps, access 3D terrain models, and integrate data for specific applications, such as land use planning and disaster management.

Here are some of the features of the Application from USGS:

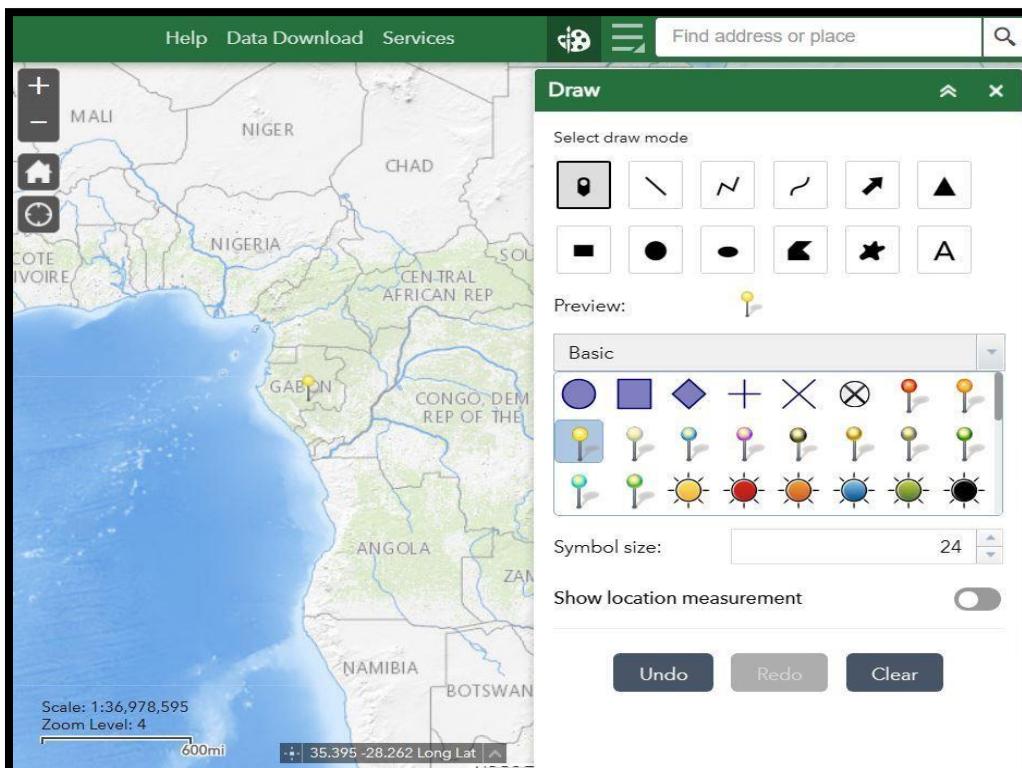
- **Geospatial Data:** The National Map provides a vast collection of geospatial data, including topographic maps, elevation data, and land cover information.

- **Interactive Maps:** Users can create interactive maps, visualize terrain, and combine multiple data layers.
- **Data Download:** The tool allows users to download geospatial datasets for use in GIS and other applications.
- **Real-Time Updates:** National Map offers real-time updates to ensure that users have access to the most current data.





These are the additional Tools that can be used in the national maps.



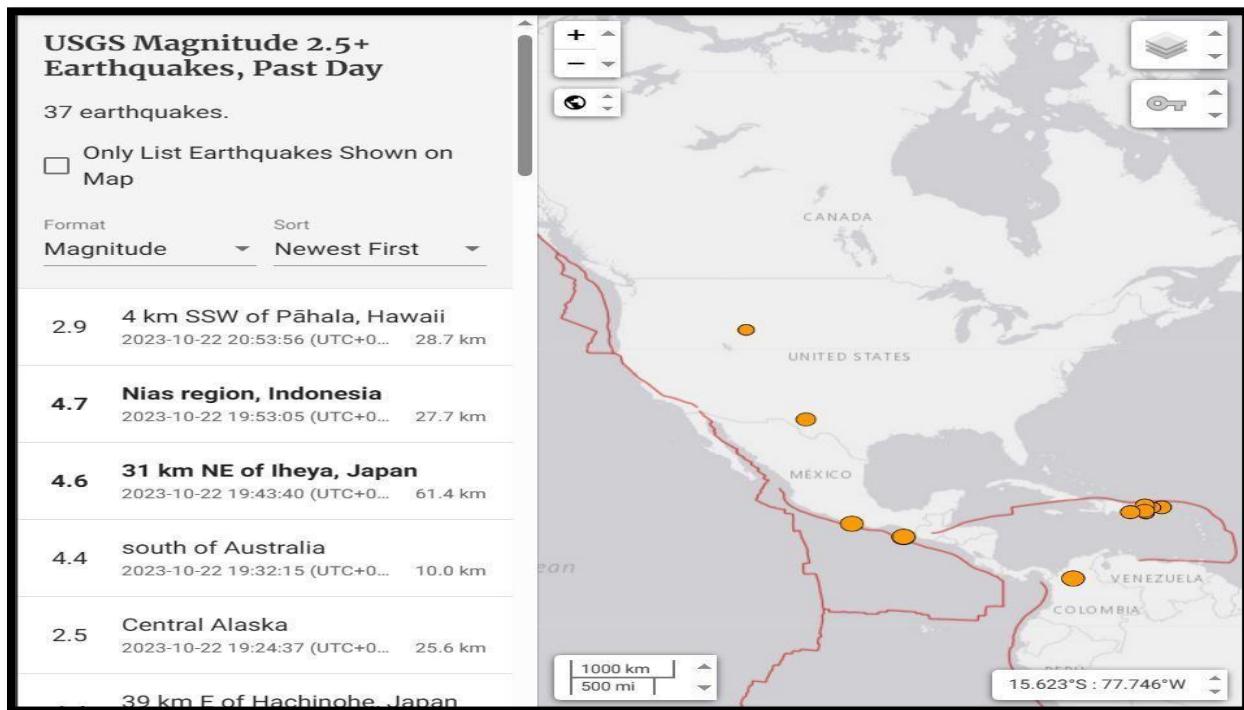
### 3. ShakeMap:

ShakeMap is a tool designed for the near-real-time mapping of ground shaking intensity following an earthquake.

**Unique Feature:** It offers rapid earthquake impact assessment, providing critical data to emergency responders, public safety officials, and earthquake researchers to understand and respond to seismic events.

Here are some of the features of the Application from USGS:

- **Earthquake Impact Assessment:** ShakeMap is a vital tool for the rapid assessment of ground shaking intensity and earthquake impacts.
- **Real-Time Data:** It provides near-real-time information after an earthquake, including ground motion, impact, and aftershock monitoring.
- **Emergency Response:** ShakeMap data is crucial for emergency responders, allowing them to identify affected areas and prioritize resources.
- **Seismic Research:** Researchers use ShakeMap to study seismic events, assess building performance, and improve earthquake preparedness.



## M 2.9 - 4 km SSW of Pāhala, Hawaii

Time 2023-10-22 20:53:56 (UTC+05:30)  
Location 19.165°N 155.495°W  
Depth 28.7 km

CLOSE



Leaflet | Esri, HERE, Garmin, © OpenStreetMap

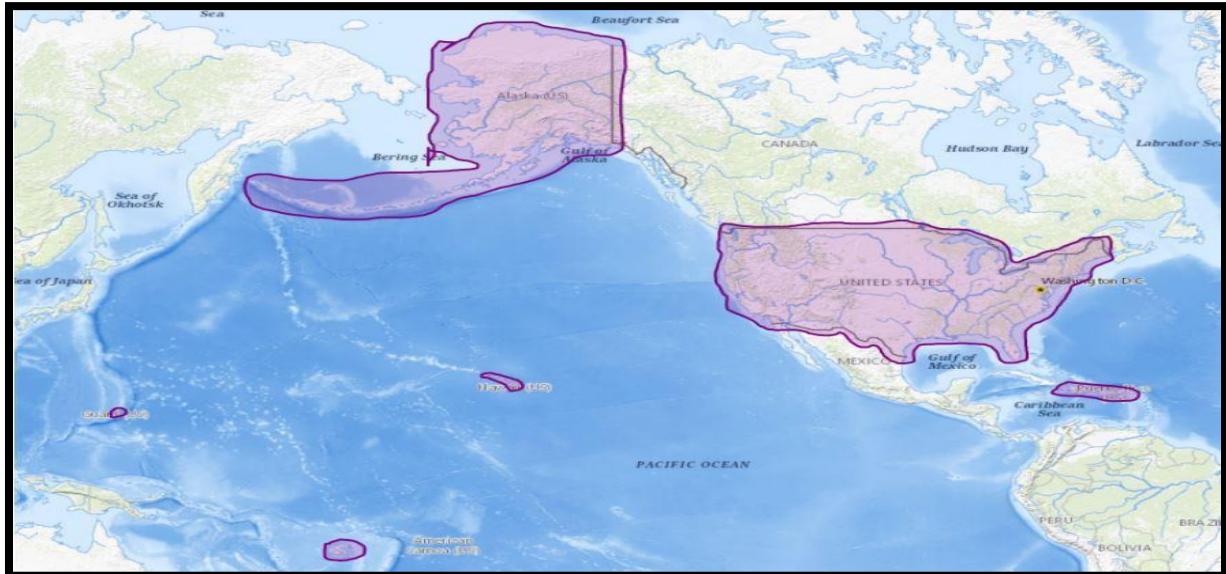
# Seismic Hazard Model, Maps, and Site-Specific Data

By [Earthquake Hazards Program](#)

Data, models, maps, source code, and additional resources can be found below.

Participate!

	U.S. Short- term	U.S. Long- term	Alaska	Hawaii	Puerto Rico & U.S. Virgin Islands	Guam & Marianas	San & Pac Isla
2023		coming soon	coming soon				
2021				<a href="#">VIEW</a>			



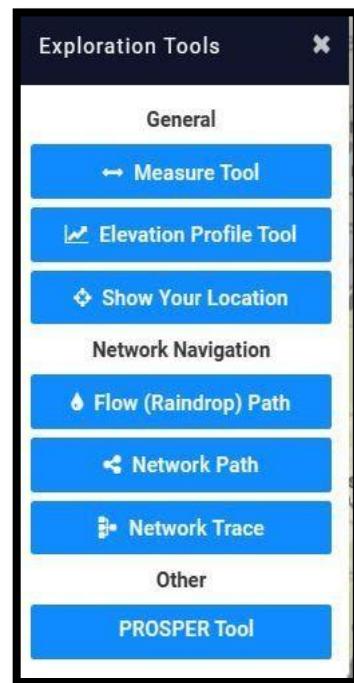
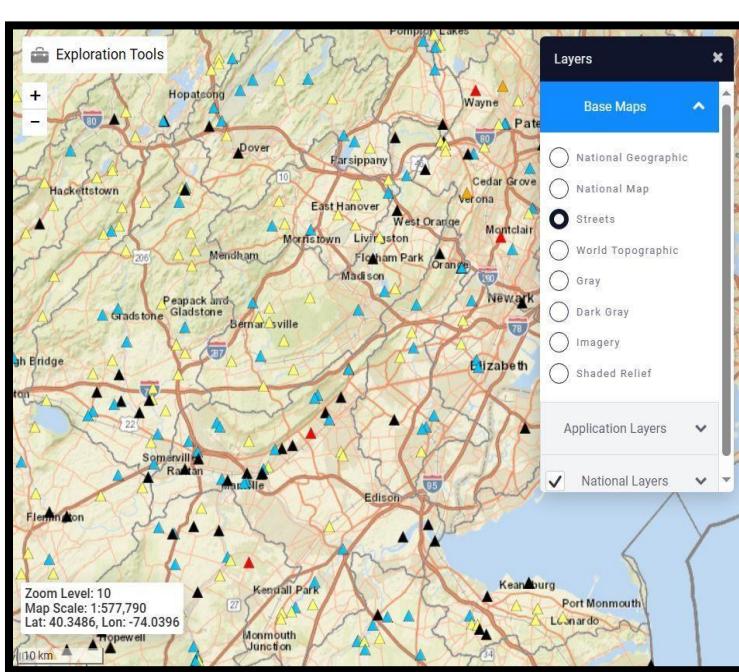
## 4. Stream Stats:

Stream Stats is a specialized tool for assessing streamflow and watershed information.

**Unique Feature:** It provides access to real-time and historical streamflow data, as well as the ability to estimate streamflow statistics for any location, aiding hydrologists, water resource managers, and planners in water-related decision-making.

Here are some of the features of the Application from USGS:

1. **Watershed Delineation:** Stream Stats offers the capability to delineate watersheds and sub-basins for specific locations. This feature is crucial for understanding the drainage patterns and flow of water in a given area.
2. **Hydrologic Analysis:** It provides hydrologists and water resource professionals with the tools needed to perform detailed hydrologic analyses. This includes calculations for streamflow, runoff, and flow duration curves.
3. **Topographic Data Integration:** Stream Stats integrates topographic data and digital elevation models (DEMs) to accurately model the flow of water and assess the impact of terrain on drainage characteristics.
4. **Peak Flow Estimation:** The tool can estimate peak flow values, which are critical for assessing flood risk and designing infrastructure such as bridges and culverts.
5. **Flood Frequency Analysis:** Stream Stats is used to estimate flood frequency statistics, including the 100-year flood event. This information is crucial for floodplain management and insurance purposes.
6. **Water Resource Planning:** Hydrologists and water resource managers use Stream Stats to plan and manage water resources, allocate water rights, and address issues related to water availability and usage.



- **Chirag:**

The United States Geological Survey (USGS) is a scientific agency of the United States government that is part of the U.S. Department of the Interior. It was established on March 3, 1879, and its primary mission is to study and monitor various aspects of the Earth's natural resources and environment.

## 1. **Map Release**

Filter Total Items: 1

Biology      Year      Search 

**▼ ADVANCED FILTERS** 

Alabama      Order 

JULY 23, 2015

### Delineation of marsh types from Corpus Christi Bay, Texas, to Perdido Bay, Alabama, in 2010

Coastal zone managers and researchers often require detailed information regarding emergent marsh vegetation types (that is, fresh, intermediate, brackish, and saline) for modeling habitat capacities and needs of marsh dependent taxa (such as waterfowl and alligator). Detailed information on the extent and distribution of emergent marsh vegetation types throughout the northern Gulf of Mexico coast

By: [Ecosystems Mission Area, Land Management Research Program, Wetland and Aquatic Research Center](#)



The latest map released by the United States Geological Survey (USGS) on October 26, 2023 is a map of intrusive activity at Kīlauea Volcano in Hawaii. The map shows where and how much magma has intruded into the volcano from October 12 to October 23, 2023. The map is based on satellite images and observations from the ground.

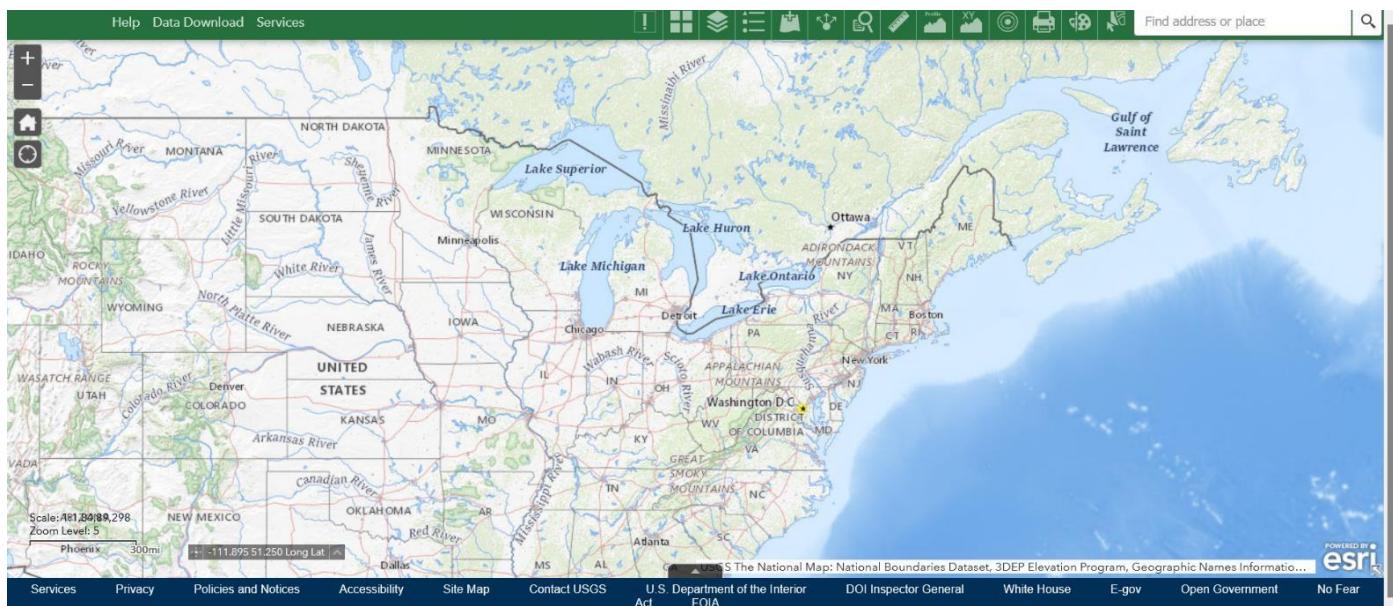
The map shows that magma is intruding into Kīlauea Volcano in many places, including the summit area, the East Rift Zone, and the Southwest Rift Zone. The map also shows that the summit caldera is continuing to grow larger, and that the ground is moving in the East Rift Zone.

## **2. National Maps**

The National Map of the United States Geological Survey (USGS) is a collection of free, nationally-consistent geographic datasets that describe the landscape of the United States and its territories. It includes data on elevation, surface water, place names, recreational trails, roads, boundaries, structures, land cover, and imagery.

The National Map is used by a wide range of people and organizations for a variety of purposes, including:

- **Recreation:** The National Map can be used to plan hiking, camping, and other outdoor activities.
- **Scientific analysis:** The National Map can be used to study climate change, natural hazards, and other environmental phenomena.
- **Emergency response:** The National Map can be used to respond to natural disasters and other emergencies.
- **Infrastructure planning:** The National Map can be used to plan and build roads, bridges, and other infrastructure.
- **Education:** The National Map can be used to teach students about geography and the environment.



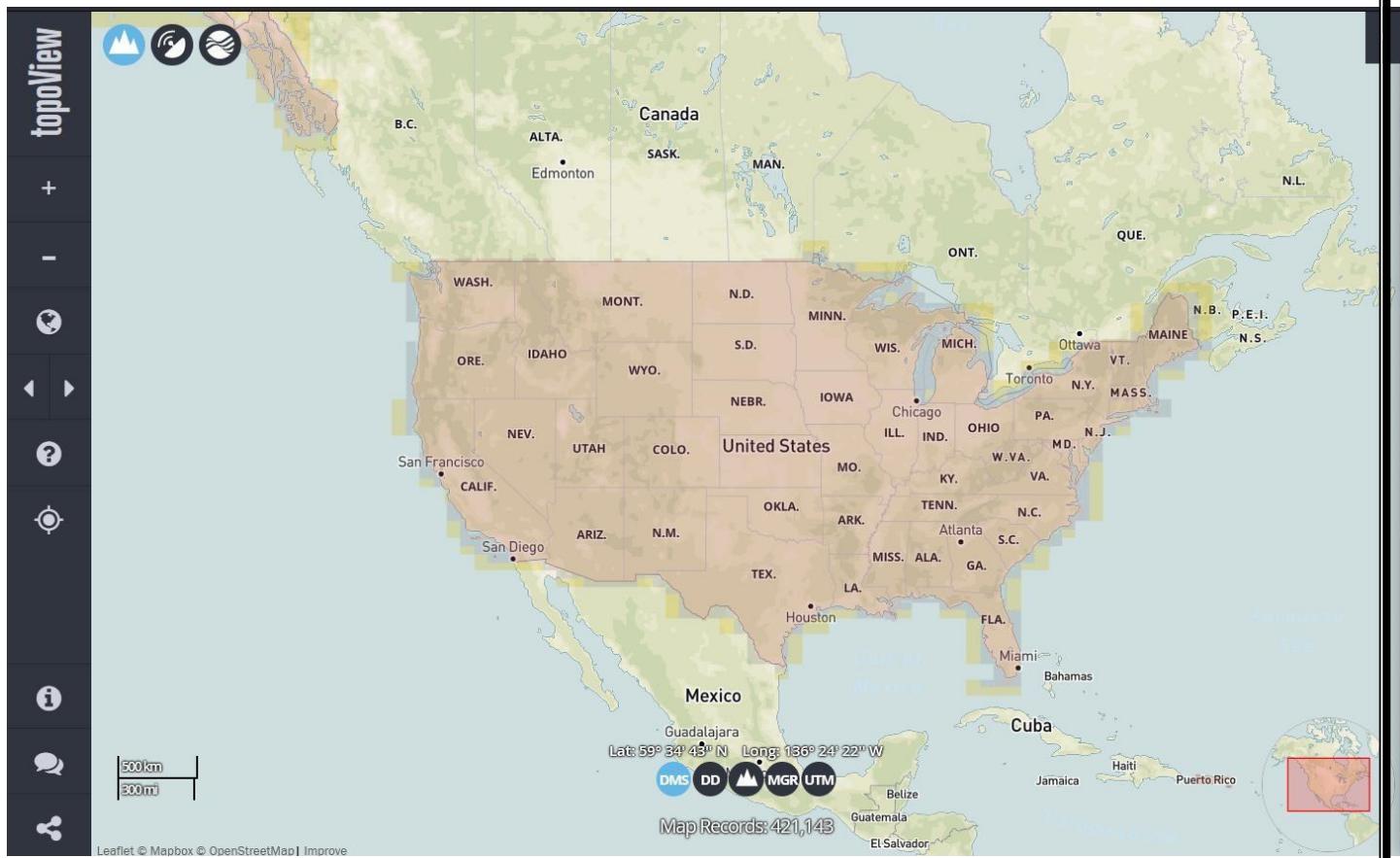
### **3. Older Topographic maps :**

The USGS Historical Topographic Map Collection (HTMC) is a digital repository of all scales and all editions of U.S. Geological Survey (USGS) printed topographic maps that were originally published between 1884 and 2006. The HTMC is available to the public for free and immediate download from the USGS website.

The HTMC includes over 240,000 scanned and georeferenced topographic maps, covering the entire United States and its territories. The maps are available in a variety of formats, including GeoPDF, GeoTIFF, JPEG, and KMZ.

The HTMC is a valuable resource for a variety of purposes, including:

- **Historical research:** The HTMC can be used to study changes in the landscape over time. For example, researchers can use the HTMC to track the development of roads, railroads, and other infrastructure, or to study the impacts of natural disasters such as floods and wildfires.
- **Genealogy:** The HTMC can be used to identify the location of ancestral homes and farms.
- **Recreation:** The HTMC can be used to plan outdoor activities such as hiking, camping, and fishing.
- **Education:** The HTMC can be used to teach students about geography, history, and the environment.



#### **4. Before and after images :**

The U.S. Geological Survey (USGS) provides various tools and resources that allow users to access "before and after" images for areas affected by natural disasters, environmental changes, or land-use alterations. These images can be valuable for monitoring and assessing the impact of events like wildfires, hurricanes, floods, and other natural or human-induced changes. The USGS offers several features and platforms to access before-and-after imagery:

- Earth Explorer:** Earth Explorer is a web-based search, discovery, and ordering tool developed by the USGS. It provides access to a wide range of geospatial data, including satellite and aerial imagery. Users can search for and compare imagery taken before and after specific events. This can be useful for assessing changes in landscapes, infrastructure, or environmental conditions.
- Hazard Data Distribution System (HDDS):** The USGS's HDDS platform offers access to various data layers, including before-and-after imagery, for responding to natural disasters. This tool is particularly valuable for emergency responders and disaster management agencies to assess the impact of events like hurricanes, earthquakes, and wildfires.

3. **National Map Viewer:** The National Map Viewer is a web-based mapping and data visualization tool that allows users to explore a wide range of geospatial data. It includes access to historical imagery, which can be used to compare landscapes and changes over time.
4. **Landsat Satellite Imagery:** Landsat is a program that has provided Earth-observing satellite data for decades. The USGS offers access to Landsat imagery archives, which can be used to create before-and-after comparisons for land-use, vegetation, and environmental changes.
5. **USGS Emergency Response Imagery:** The USGS provides emergency response imagery to support disaster management efforts. This includes acquiring, processing, and distributing imagery captured by satellites or aircraft immediately following significant events. These images can be used to assess the impact of disasters and support recovery efforts.



## 5. Videos :

The U.S. Geological Survey (USGS) is primarily known for its research and data related to geological, natural resource, and environmental topics. The USGS doesn't typically produce videos as its main output. However, they do provide various multimedia resources and tools that include videos and animations to help communicate their scientific findings and data to the public and researchers. These resources can be found on their website and other online platforms. Here are some ways you might find videos and multimedia content related to USGS work:

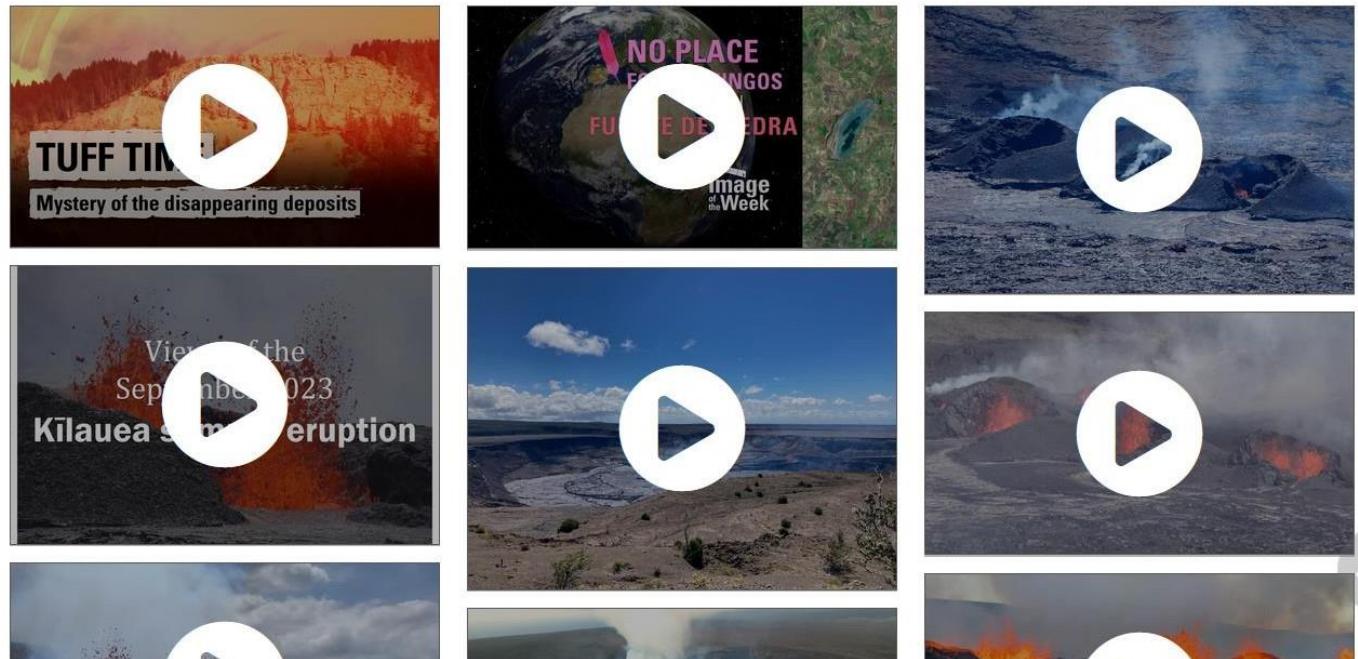
1. **USGS YouTube Channel:** The USGS maintains a YouTube channel where you can find videos related to various geological and environmental topics. These videos may include animations, presentations, and interviews with USGS scientists.

2. **Webinars and Presentations:** USGS scientists often participate in webinars and presentations related to their research. Some of these events are recorded and made available as videos on the USGS website or through partner organizations.
3. **Educational Materials:** The USGS provides educational resources for schools and the public. These resources can include videos and animations to explain scientific concepts and data.
4. **Public Outreach:** In their efforts to communicate scientific information to the public, the USGS may use multimedia tools, including videos, to explain topics like earthquakes, volcanoes, land use, and more.
5. **USGS Social Media:** The USGS may share multimedia content, including videos, on their social media platforms, such as Twitter, Facebook, and Instagram.

Filter Total Items: 2849

Type  Year  Search

**ADVANCED FILTERS**



- **Dev:**

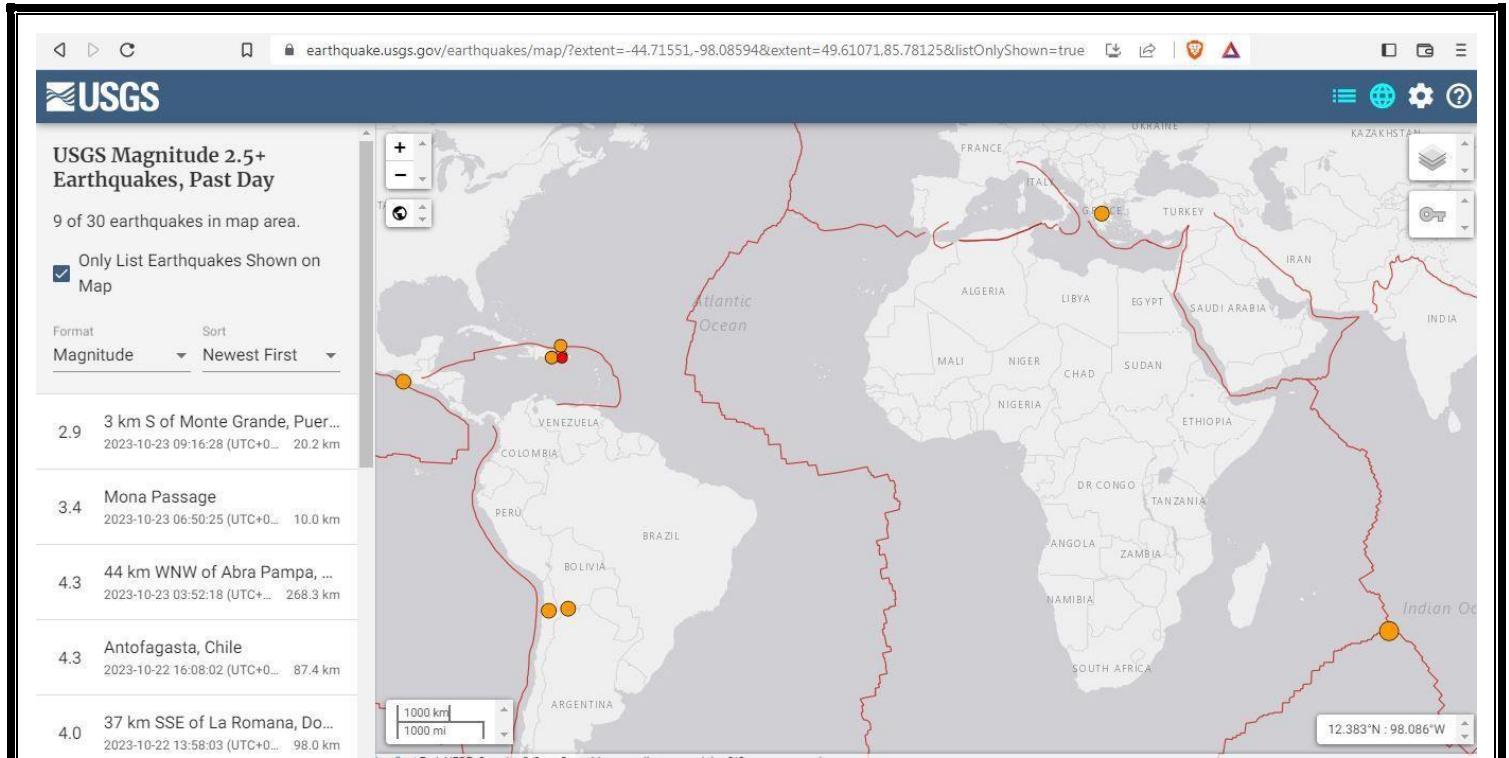
The U.S. Geological Survey (USGS) is a federal science agency that collects, monitors, analyzes, and provides scientific understanding of natural resource conditions, issues, and problems. It is the nation's largest water, earth, and biological science and civilian mapping agency.

## 1. earthquakes in map area.

- Seismometers allow us to detect and measure earthquakes by converting vibrations due to seismic waves into electrical signals, which we can then display as seismograms on a computer screen.



- Collapse of Fourth Avenue near C Street, Anchorage, due to earthquake caused landslide. Before the earthquake, the sidewalk at left, which is in the graben, was at street level on the right.
- The graben subsides 11 feet in response to 14 feet of horizontal movement. Anchorage district, Cook Inlet region, Alaska. 1964. Photos from the Earth Science Photographs from the U.S. Geological Survey Library, by Joseph K. McGregor and Carl Abston, U.S. Geological Survey Digital Data Series DDS-21, 1995. (Public domain.)



## 2. Volcanic Maps:

- The USGS Volcano Hazards Program enhances public safety and minimize social and economic disruption from volcanic unrest and eruption. We accomplish this by delivering effective forecasts, warnings, and information about volcano hazards based on scientific understanding of volcanic processes. Learn more by exploring USGS volcanic maps.

Filter Total Items: 170

Maps and Map
▼
Year
▼
Search
🔍

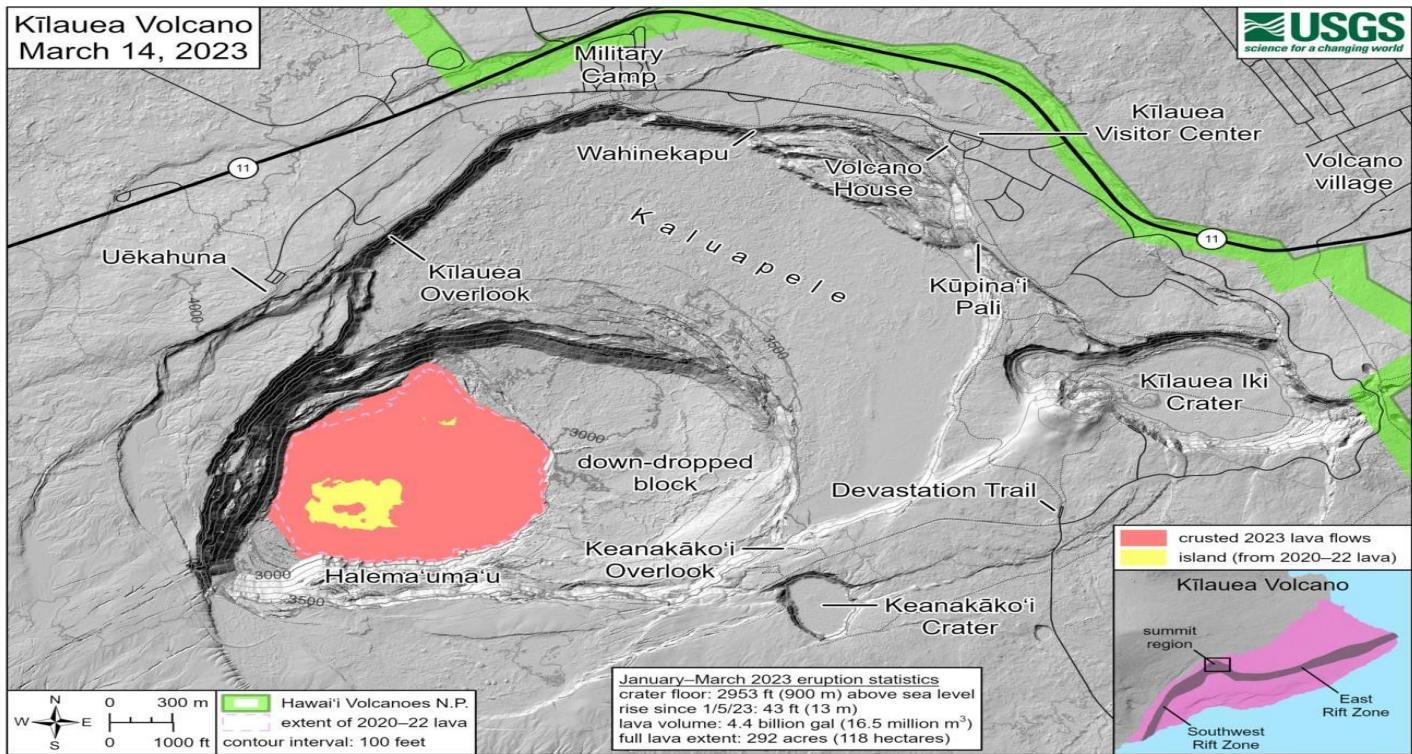
### ▼ ADVANCED FILTERS

MARCH 14, 2023

## March 14, 2023 – Kīlauea summit eruption reference map

The Kīlauea summit eruption has been paused since Tuesday, March 7, 2023, and this reference map depicts the Halema‘uma‘u crater floor in its present noneruptive state.

By: Natural Hazards Mission Area, Volcano Hazards Program, Kīlauea



The Kīlauea summit eruption has been paused since Tuesday, March 7, 2023, and this reference map depicts the Halema'uma'u crater floor in its present noneruptive state. The eruption statistics provided here reflect activity up until the pause, since they are derived from measurements taken during a HVO helicopter overflight on Friday, March 10. Over the course of the eruption, the crater floor rose an average of 43 feet (13 meters) to a new volume-averaged elevation of 2,953 feet (900 meters) above sea level. The full extent of new lava from the eruption is 292 acres (118 hectares); this value is slightly less than that reported on the last eruption reference map, due to remapping of some of the flow margins.

### **3. Map Releases :**

Our programs produce accurate geologic maps and 3-D geologic frameworks that provide critical data for sustaining and improving the quality of life and economic vitality of the Nation.

Filter Total Items: 4

Science Technc ▾

Year



Search



▼ ADVANCED FILTERS

JULY 30, 2021

## Colored shaded-relief bathymetry, acoustic backscatter, and selected perspective views of the northern part of the California Continental Borderland, southern California

The California Continental Borderland is the complex continental margin in southern California that extends from Point Conception southward into northern Baja California (Fisher and others, 2009). This colored shaded-relief bathymetry map of the northern continental borderland in southern California was generated primarily from multibeam-echosounder data collected by the University of Washington i

By: Natural Hazards Mission Area, Coastal and Marine Hazards and Resources Program, Pacific Coastal and Marine Science Center

The California Continental Borderland is the complex continental margin in southern California that extends from Point Conception southward into northern Baja California (Fisher and others, 2009). This colored shaded-relief bathymetry map of the northern continental borderland in southern California was generated primarily from multibeam-echosounder data collected by the University of Washington in 2016, the Ocean Exploration Trust-Nautilus Exploration Program in 2015–17, and the National Oceanic and Atmospheric Administration in 2017. These datasets were processed in part by the U.S. Geological Survey. Additional smaller amounts of publicly available multibeam-bathymetry data collected by other federal and local agencies, academic institutions, and private firms were also incorporated into this map. Since the production of this map, other multibeam-bathymetry data have been collected in this region.

Publication Year	2021
Title	Colored shaded-relief bathymetry, acoustic backscatter, and selected perspective views of the northern part of the California Continental Borderland, southern California
DOI	<a href="https://doi.org/10.3133/sim3473">10.3133/sim3473</a>
Authors	Peter Dartnell, Emily C. Roland, Nicole A. Raineault, Christopher M. Castillo, James E. Conrad, Renato Kane, Daniel S. Brothers, Jared W. Kluesner, Maureen A. L. Walton
Publication Type	Report

Publication Subtype	USGS Numbered Series
Series Title	Scientific Investigations Map
Series Number	3473
Index ID	<a href="#">sim3473</a>
Record Source	<a href="#">USGS Publications Warehouse</a>
USGS Organization	Pacific Coastal and Marine Science Center

#### **4. wildland-fire-science**

The USGS fire science mission is to produce and deliver the best available scientific information, tools, and products to support land and emergency management by individuals and organizations at all levels. Below are web tools associated with our fire science portfolio.



To help address growing wildfire-related challenges in America, the USGS developed a Wildland Fire Science Strategy that lays out the critical needs for wildfire research over the next five years. This strategy can be used to better understand the balance between fire's benefits and its detrimental impacts.



USGS Firelight newsletter provides you updates on the latest USGS fire science for a changing world. Each issue features a variety of our wildland fire science, providing information, data and tools for use by managers before, during, and after fires

## **5. Stereograms:**

The USGS has a rich historical photographic library containing photography from the late 1800s during the exploration of the West. A subset of this photography was the capturing of stereograph images (two images side by side). The USGS has implemented a method based off of a NYPL open source project (Stereogramimator) to bring together stereograph images into 3D-like animated GIFs.

- Yellowstone National Park, Wyoming. Camp scene. Steve Hovey, "wagon boss." U.S. Geological and Geographical Survey of the Territories (Hayden Survey). Stereoscopic view.

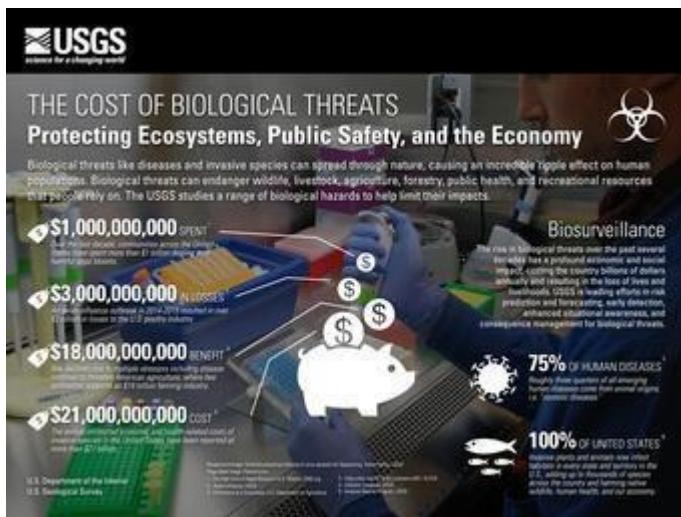


- Church in Chihuahua, Mexico. No date. (Stereoscopic view) from the USGS Denver Library Photographic Collection.

- **Ayush:**

## 1. Threats to Animals

Climate change, urbanization, habitat loss, the spread of invasive species – these and other threats pose a significant challenge to wildlife managers. Biological threats to animals like diseases and invasive species can spread through nature and cause an incredible ripple effect on humans. These threats are costly and endanger not only wildlife, but also livestock, agriculture, forestry, public health, water quality, and recreational resources that people rely on.



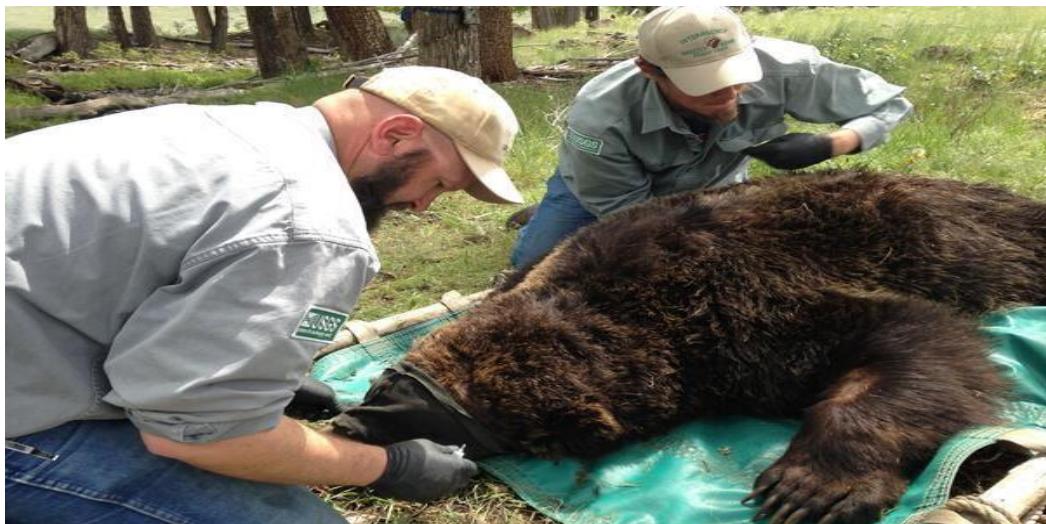
Understanding, monitoring, and predicting threats to animals contributes to the USGS goal of providing science to support the protection, conservation, and enhancement of the Nation's biodiversity. USGS scientists study how animal populations are responding to threats and help arm managers and the public with the information and tools they need to choose the most effective management strategies that will support species now and into the future.

## 2. Population Monitoring

USGS scientists collect data by going out in the field to survey wildlife or collect remotely sensed data using special detectors such as cameras and satellites. Whether we're putting GPS collars on caribou to track their migrations, evaluating satellite imagery to see where Pacific walruses are resting on the Arctic coastline, or banding birds to track their behavior, lifespans, and health, USGS scientists are collecting the data needed to make informed management decisions for our Nation's wildlife.

### On Land

- **Grizzly bears:** As participants in the Interagency Grizzly Bear Study Team, USGS scientists have been monitoring grizzly bears in Yellowstone for over 40 years—contributing to what is perhaps the largest collection of scientific information on any bear species in the world.



## In Water

- **Polar bears:** USGS leads long-term research on polar bears to inform policy and conservation decisions for the species and its Arctic habitat. Scientists are studying two populations in Alaska to understand how rapidly warming temperatures affect polar bear movement, denning, population size, and health.



## 3. Invasive Plants

Every plant and animal species has a native range where it evolved. When a species exists in a location beyond its natural range, it is considered a “non-native” species in that area. When a non-native species establishes in a new habitat, causing harm to the environment or humans, it becomes “invasive”. The annual estimated economic and health-related costs of invasive species in the U.S. have been reported at [more than \\$21 billion](#) and adversely affect every state in the country. Invasive plants represent a major threat to global and local biodiversity while also having negative socio-economic and human health impacts. Invasive plants displace native plants, prevent native plant growth, reduce agricultural production, and induce allergies.



## 4. Climate Change

Climate helps shape ecosystems. Things like average temperatures, humidity, and rainfall determine where plants and animals live. If a region's climate changes, the ecosystem changes as well. Climate change poses one of the biggest threats to plants, leading to an increased spread of invasive species, increased vulnerability to insect pests, the loss of native plant species and changes in their distribution. USGS scientists are leading efforts to understand the current and future impacts of climate change on plants. This information helps management agencies identify adaptation strategies and actions that can help support vulnerable plant species in the face of a changing climate. Explore examples of our science below:

- Monitoring the conversion of tidal freshwater wetlands in the Southeast and mid-Atlantic to “Ghost Forests”—forests in which trees have died due to increases in salinity as sea levels rise and push saltier water upstream.
- Identifying how changes in the amount and timing of precipitation affect big sagebrush in the Great Basin.
- Investigating the effects of drought and warming temperatures on plants in the southwestern U.S.
- Exploring the effects of estimated future sea-level rise on mangrove forests in Micronesia.
- Using satellite data to monitor changes in phenology, or the study of animal and plant life cycles, a powerful tool for understanding life cycle trends and the impacts of climate change on ecosystems.

## 5. Ecosystem Restoration

Ecosystem restoration is the act of rehabilitating a degraded or lost ecosystems through activities such as planting native trees and shrubs and controlling invasive species. To do this, land managers need tools to help get the right plants, in the right place, at the right time for successful restoration. The USGS develops strategies

and techniques to understand and facilitate the restoration of native species and habitats that have deteriorated due to threats such as invasive species and climate change. Explore examples of our science below:



## **Practical-5**

### **Introduction to Various GIS Software Packages**

- **Introduction**

- Geographic Information Systems (GIS) are powerful tools for capturing, storing, analysing, and visualizing geographic data. Various GIS software packages are available to meet the diverse needs of users, from government agencies and environmental organizations to businesses and researchers. This report provides an introduction to some of the prominent GIS software packages, including Google Earth Pro, Bhuvan , United States Geological Survey (USGS), ArcGIS, QGIS, GRASS GIS, OpenStreetMap (OSM) and MapInfo Pro.

## 1. **Google Earth Pro**

✓ **How to Access:**

- Google Earth Pro is a free software available for download from the Google Earth website.

✓ **Applications:**

- Exploration and visualization of Earth's surface.
- Educational purposes.
- Planning travel routes and exploring locations.

✓ **Advantages:**

- User-friendly and widely accessible.
- High-resolution imagery.
- Integration with other Google services.

## 2. **Bhuvan (By ISRO)**

✓ **How to Access:**

- ✓ Bhuvan, developed by the Indian Space Research Organization (ISRO), is available for free on the Bhuvan website.

✓ **Applications:**

- Agricultural planning and monitoring.

- Disaster management and response.
- Environmental planning and research.

✓ **Advantages:**

- India-centric geospatial data.
- Real-time data and monitoring.
- Customized for Indian users.

### **3. United States Geological Survey (USGS)**

✓ **How to Access:**

- USGS provides various data and tools on its official website, including the National Map Viewer, Earth Explorer, Science Data CatLog, and more.

✓ **Applications:**

- Geological and environmental research.
- Natural resource management.
- Disaster prediction and mitigation.
- Urban and land use planning.

✓ **Advantages:**

- Wide range of geospatial data.
- Comprehensive tools and resources.
- Support for government, researchers, and the public.

### **4. QGIS (Quantum GIS)**

✓ **How to Access:**

- QGIS is open-source software available for free. Users can download it from the official website.

✓ **Applications:**

- Local government and community mapping
- Academic research and education
- Natural resource management

✓ **Advantages:**

- Open-source and community-driven.
- Supports a wide range of data formats.
- Regular updates and plugins.

## **5. OpenStreetMap (OSM)**

### **✓ How to Access:**

- OpenStreetMap data can be accessed freely through the OSM website, APIs, or various third-party tools.

### **✓ Applications:**

- Humanitarian relief and disaster response
- Custom map creation
- Location-based services

### **✓ Advantages:**

- Collaboratively created and updated.
- Customizable and flexible.
- Global coverage.

### **● Conclusion**

- Each GIS software package has its unique features, applications, and advantages. The choice of GIS software depends on specific needs, resources, and expertise. GIS remains a versatile tool for spatial analysis, decision-making, and geographic data management across diverse sectors and applications.