Group 32 – Frankenstein Bears
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6/11/2020

The Willamette River Zoo – A Zookeeping Database

URL: http://flip1.engr.oregonstate.edu:8080/

Project Changes

The database design for the Willamette River Zoo has undergone many changes since its original inception. Our initial proposal was rudimentary, largely due to our general lack of understanding of the project's finer requirements. Over the course of this term our vision has been fleshed out and expanded upon but is still simple and refined in the end.

Other than minor changes to capitalization and pluralization, our entities have remained consistent throughout our project. Their attributes, however, have gone through many iterations of change. Many of them were originally set to hold values that really should be the result of queries. For example, our Species entity had an attribute 'SpeciesPopulation' that displayed how many animals of that type there were, instead of allowing a user SELECT query this. Each entity had one or more of this type of attribute, so changing them all to non-query variables not only made for a more useful database, but also helped differentiate them from one another.

The other major issue our project proposal had concerned the relationships between entities. While a significant portion of our confusion likely resulted from the attributes, we also struggled to understand how to depict/implement them altogether. It wasn't until we created the .sql file and figured out the FKs that the 1:M relationships clicked. The M:M relationship made much more sense after fixing our broken schema and added the critical relationship table. The ERD and schema gradually became their current versions by week 7 and was last design hurdle we had to clear.

Our website started out with just a few links in the first html step, but quickly grew to a fully-fledged front end in just a week's time. We ran into some issues hosting the pages and then connecting the database to them but managed to resolve them rather quickly. Most of the peer feedback we received in the final weeks were suggestions on how to polish the website, but that the query fields themselves appeared to work fine. Our final addition is the relationship table that was pointed out we were missing.

Project Outline

The Willamette River Zoo is rapidly expanding and needs an efficient way to manage all its employees and animals. In recent months, they have grown to 25 zookeepers, 28 different species, 8 exhibits, and 180 total animals. Specifically, they need to ensure that the number of employees is appropriate for the number of exhibits and animals on display. The zoo also needs to ensure that an exhibit can support the animals it contains and can only sustainably house a certain number of unique species. For the social and reproductive health of the animals, each species always needs to be represented with an adequate number of animals.

A database will help the zoo organize this data and ensure that operations are running both sustainably and profitably. It is their priority to properly take care of the animals and educate the public but would like to do with a minimum number of zookeepers and efficiently as possible. Implementation of the database will reveal if there are currently areas over-capacity, inappropriately staffed, or have room for expansion.

Database Outline

zookeepers – Zoo employees who take care the animals in each exhibit

- keeper_id – PK, auto increment, not NULL, int; unique identifier for zookeeper.
- keeper_name – varchar; full name of zookeeper.
- max_exhibits - int; maximum number of exhibits the zookeeper could manage.
- keeper_total – int; total number of animals responsible for.

- Relationships
    - zookeeper-exhibit: A zookeeper must manage at least one exhibit. And each exhibit must be managed by at least one zookeeper. (M:M)

animals – each individual animal that lives in the zoo

- animal_id – PK, auto increment, not NULL, int; unique identifier for animal
- animal_name - varchar; name of animal
- species_type – FK, varchar; which will be the species_name number (in species entity)
- exhibit_home – FK, int; which will be the exhibit_id number (in exhibit entity)

- Relationships
    - animal-exhibit: An animal can only ever belong to one exhibit. Each exhibit can contain many animals (including zero). (1:M)
    - animal-species: An animal can only ever belong to one species. Each species can contain many animals (including zero). (1:M)

exhibits – Where animals are contained and where zookeepers take care of them

- exhibit_id – PK, auto increment, not NULL, int; unique identifier for exhibit.
- exhibit_name – varchar; name of exhibit.
- max_species – int, the maximum number of different species the exhibit can hold
- exhibit_size – int; total number of animals in exhibit

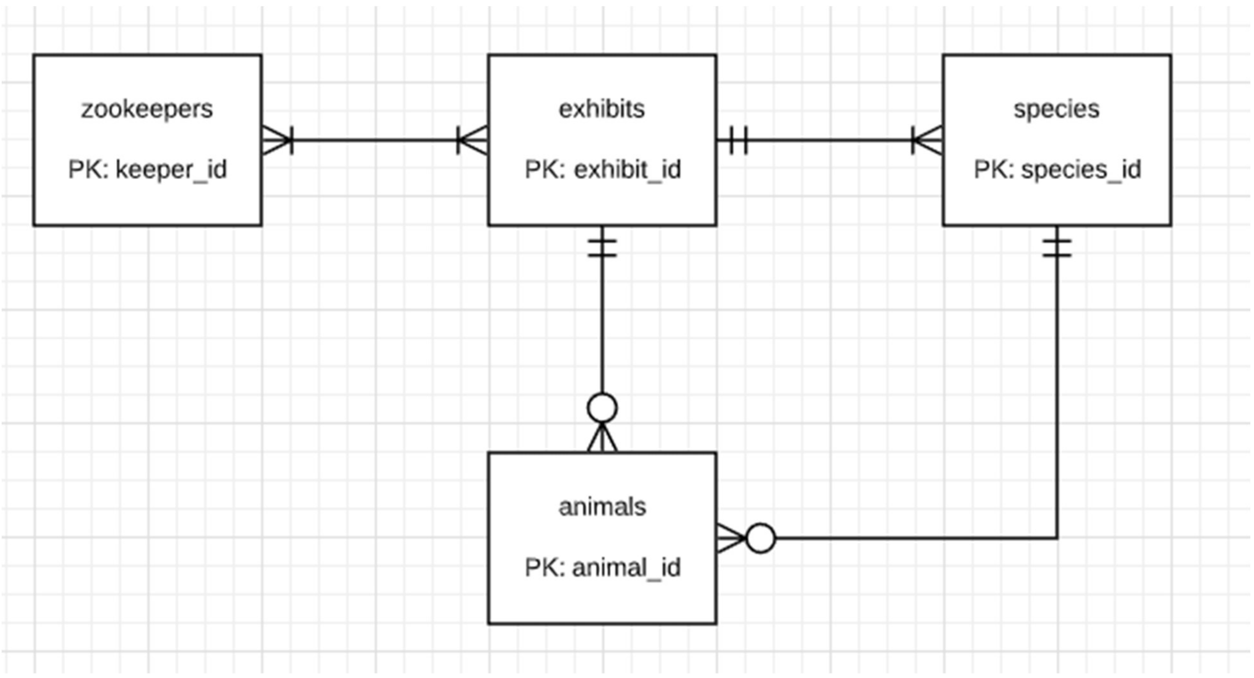
- Relationships
    - zookeeper-exhibit: A zookeeper must manage at least one exhibit. And each exhibit must be managed by at least one zookeeper. (M:M)
    - animal-exhibit: An animal can only ever belong to one exhibit. Each exhibit can contain many animals (including zero). (1:M)
    - exhibit-species: An exhibit must house at least one species. And at species can be found in exactly one exhibit. (1:M)

species – The specific family type the animal belongs to.

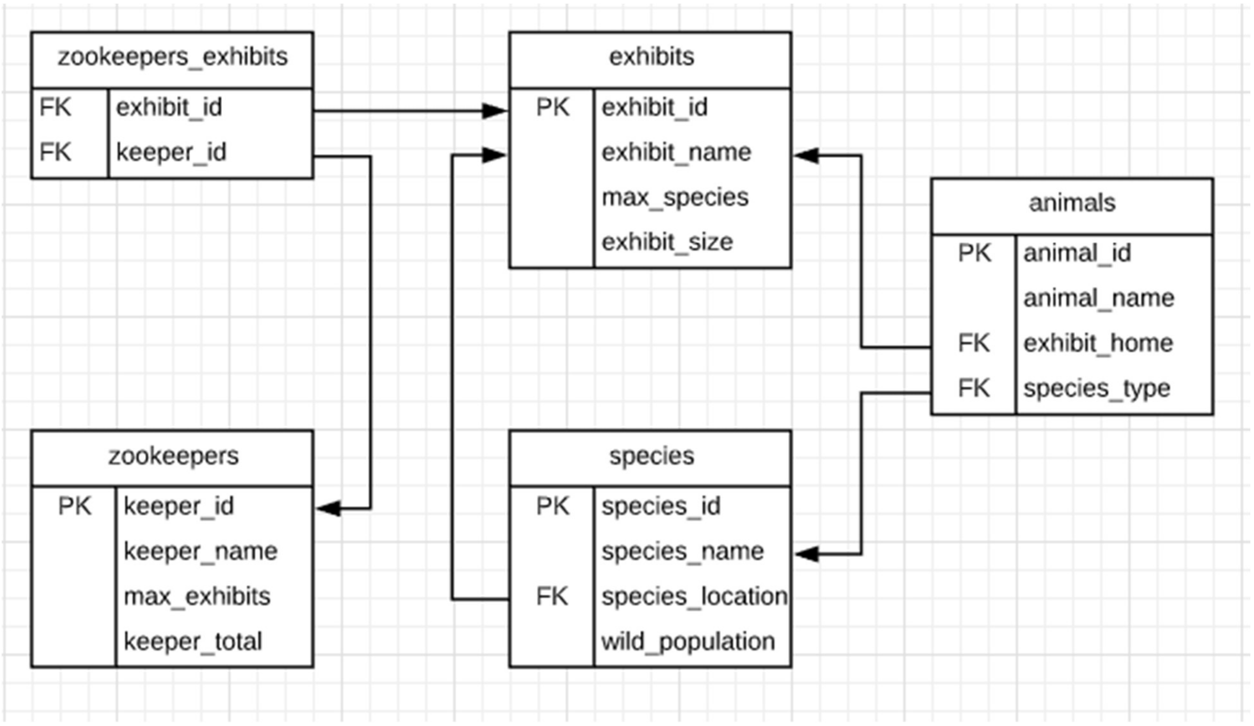
- species_id – PK, auto increment, not NULL, int; unique identifier for species.
- species_name – varchar; name of species.
- species_location – FK, varchar; which will be the exhibit_name string (in exhibit entity)
- wild_population – int; the number of animals of that species currently in the wild;

- Relationships
    - exhibit-species: An exhibit must house at least one species. And at species can be found in exactly one exhibit. (1:M)
    - animal-species: An animal can only ever belong to one species. Each species can contain many animals (including zero). (1:M)

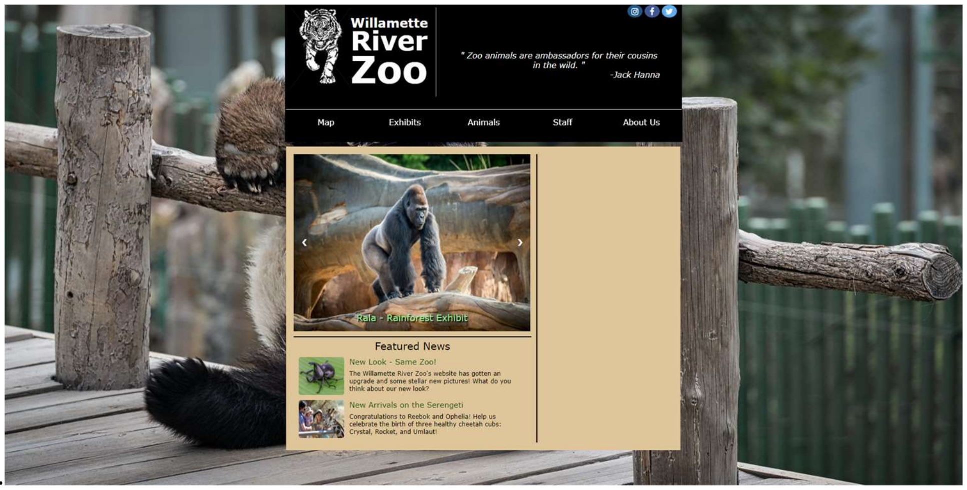
ERD


zookeepers
PK: keeper_id
exhibits
PK: exhibit_id
species
PK: species_id
animals
PK: animal_id

Schema


zookeepers_exhibits
FK exhibit_id
FK keeper_id
exhibits
PK exhibit_id
exhibit_name
max_species
exhibit_size
animals
PK animal_id
animal_name
FK exhibit_home
FK species_type
zookeepers
PK keeper_id
keeper_name
max_exhibits
keeper_total
species
PK species_id
species_name
FK species_location
wild_population

Screenshots

1. Main Page
    a. .
Willamette River Zoo
" Zoo animals are ambassadors for their cousins in the wild. "
-Jack Hanna
Map
Exhibits
Animals
Staff
About Us
Rala - Rainforest Exhibit

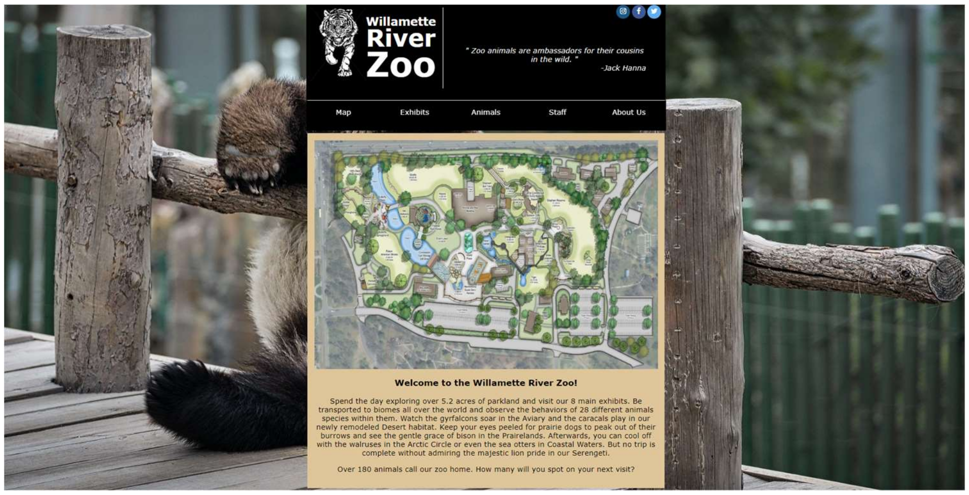
Featured News

New Look - Same Zoo!

The Willamette River Zoo's website has gotten an upgrade and some stellar new pictures! What do you think about our new look?

New Arrivals on the Serengeti

Congratulations to Reebok and Ophelia! Help us celebrate the birth of three healthy cheetah cubs: Crystal, Rocket, and Umlaut!

2. Map Page
    a. 
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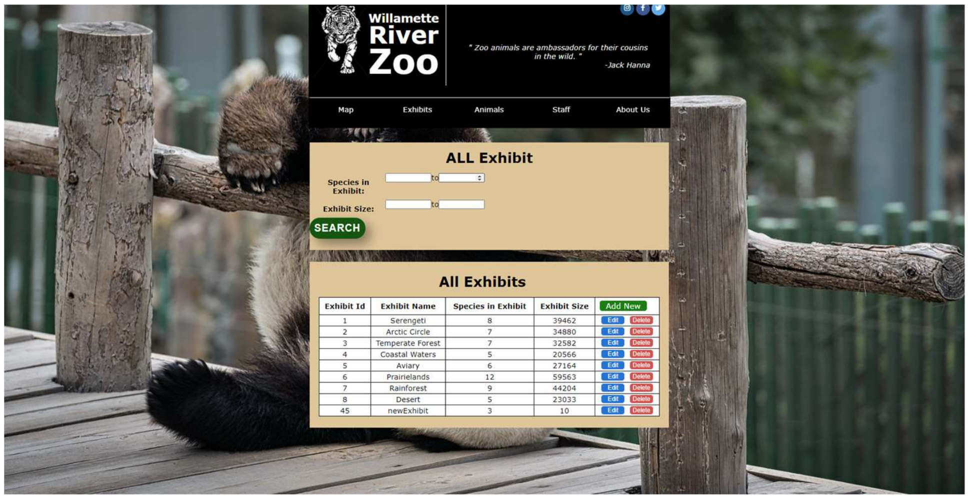
Welcome to the Willamette River Zoo!

Spend the day exploring over 5.2 acres of parkland and visit our 8 main exhibits. Be transported to biomes all over the world and observe the behaviors of 28 different animals species within them. Watch the gyrfalcons soar in the Aviary and the caracals play in our newly remodeled Desert habitat. Keep your eyes peeled for prairie dogs to peak out of their burrows and see the gentle grace of bison in the Prairelands. Afterwards, you can cool off with the walruses in the Arctic Circle or even the sea otters in Coastal Waters. But no trip is complete without admiring the majestic lion pride in our Serengeti.

Over 180 animals call our zoo home. How many will you spot on your next visit?

3. Exhibits > All Exhibits (SELECT/CREATE/**UPDATE/DELETE** in `exhibits` table)
    a. 

ALL Exhibit

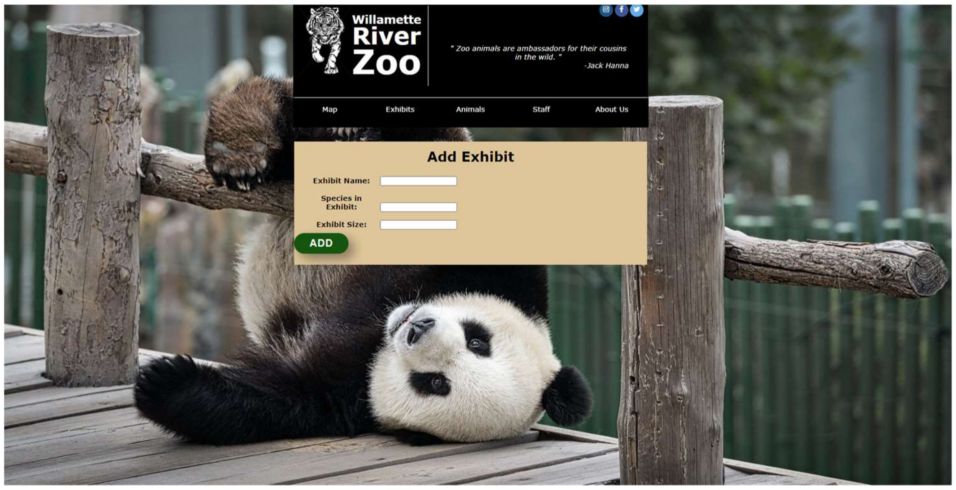
Species in Exhibit: to

Exhibit Size: to

All Exhibits

Exhibit Id	Exhibit Name	Species in Exhibit	Exhibit Size	Add New
1	Serengeti	8	39462	Edit Delete
2	Arctic Circle	7	34880	Edit Delete
3	Temperate Forest	7	32582	Edit Delete
4	Coastal Waters	5	20566	Edit Delete
5	Aviary	6	27164	Edit Delete
6	Prairielands	12	59563	Edit Delete
7	Rainforest	9	44204	Edit Delete
8	Desert	5	23033	Edit Delete
45	newExhibit	3	10	Edit Delete

4. Exhibits > Add Exhibits (CREATE in `exhibits` table)

a. 
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" Zoo animals are ambassadors for their cousins in the wild. " -Jack Hanna
Map
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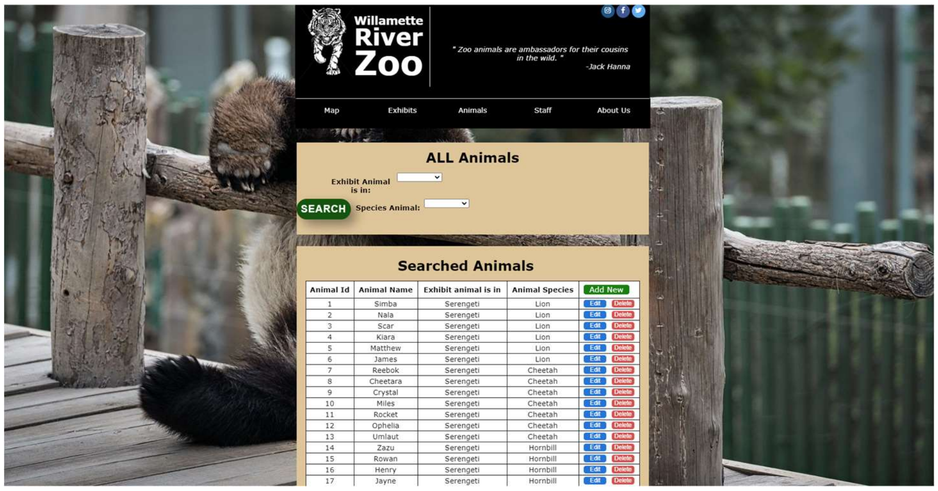
ADD

Add Exhibit

Exhibit Name:	
Species in Exhibit:	
Exhibit Size:	

5. Animals > All Animals (SELECT/CREATE/**UPDATE/DELETE** in `animals` table)

a. 
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ALL Animals

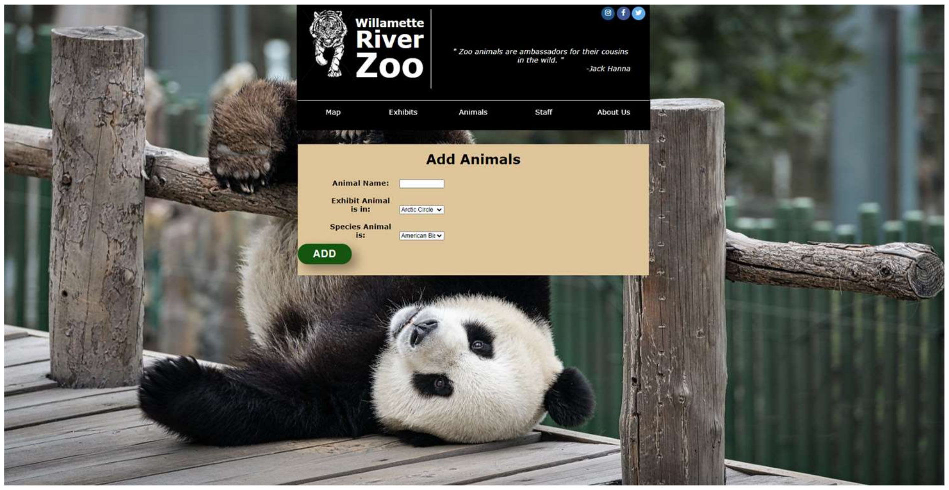
Exhibit Animal is in:

Species Animal:

Searched Animals

Animal Id	Animal Name	Exhibit animal is in	Animal Species	Add New
1	Simba	Serengeti	Lion	Edit Delete
2	Nala	Serengeti	Lion	Edit Delete
3	Scar	Serengeti	Lion	Edit Delete
4	Kiara	Serengeti	Lion	Edit Delete
5	Matthew	Serengeti	Lion	Edit Delete
6	James	Serengeti	Lion	Edit Delete
7	Reebok	Serengeti	Cheetah	Edit Delete
8	Cheetara	Serengeti	Cheetah	Edit Delete
9	Crystal	Serengeti	Cheetah	Edit Delete
10	Miles	Serengeti	Cheetah	Edit Delete
11	Rocket	Serengeti	Cheetah	Edit Delete
12	Ophelia	Serengeti	Cheetah	Edit Delete
13	Umlaut	Serengeti	Cheetah	Edit Delete
14	Zazu	Serengeti	Hornbill	Edit Delete
15	Rowan	Serengeti	Hornbill	Edit Delete
16	Henry	Serengeti	Hornbill	Edit Delete
17	Jayne	Serengeti	Hornbill	Edit Delete

6. Animals > Add Animals (CREATE in `animals` table)

a. 
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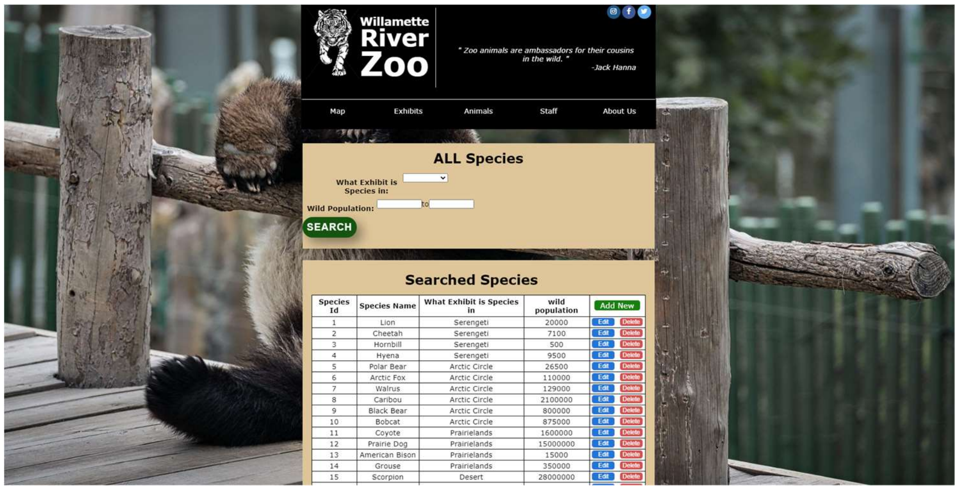
Add Animals

Animal Name:	
Exhibit Animal is in:	Arctic Circle
Species Animal is:	American Bis

7. Animals > All Species (SELECT/CREATE/**UPDATE/DELETE** in `species` table

   a. 

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ALL Species

What Exhibit is Species in:

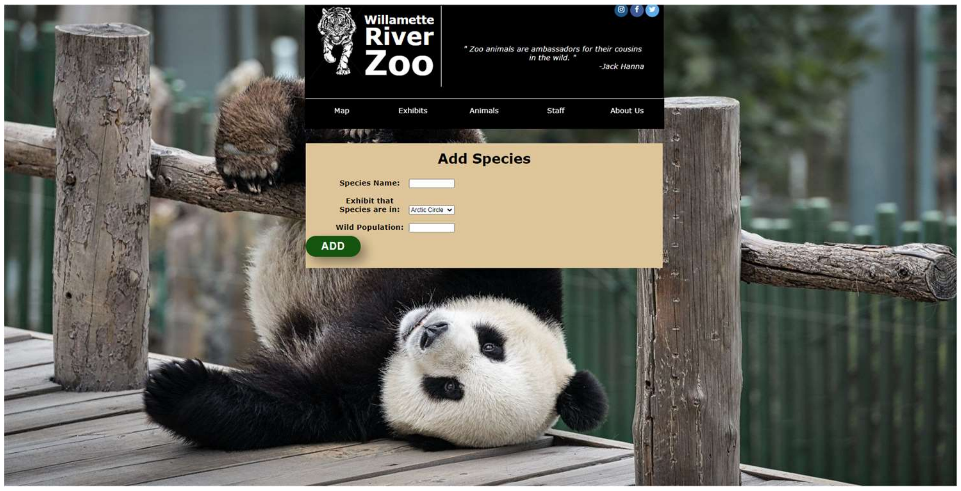
Wild Population: to

SEARCH

Searched Species

Species Id	Species Name	What Exhibit is Species in	wild population	Add New
1	Lion	Serengeti	20000	Edit Delete
2	Cheetah	Serengeti	7100	Edit Delete
3	Hornbill	Serengeti	500	Edit Delete
4	Hyena	Serengeti	9500	Edit Delete
5	Polar Bear	Arctic Circle	26500	Edit Delete
6	Arctic Fox	Arctic Circle	110000	Edit Delete
7	Walrus	Arctic Circle	129000	Edit Delete
8	Caribou	Arctic Circle	2100000	Edit Delete
9	Black Bear	Arctic Circle	800000	Edit Delete
10	Bobcat	Arctic Circle	875000	Edit Delete
11	Coyote	Prairielands	1600000	Edit Delete
12	Prairie Dog	Prairielands	15000000	Edit Delete
13	American Bison	Prairielands	15000	Edit Delete
14	Grouse	Prairielands	350000	Edit Delete
15	Scorpion	Desert	28000000	Edit Delete

8. Animals > Add Species (CREATE in `species ` table)

   a. 

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Add Species

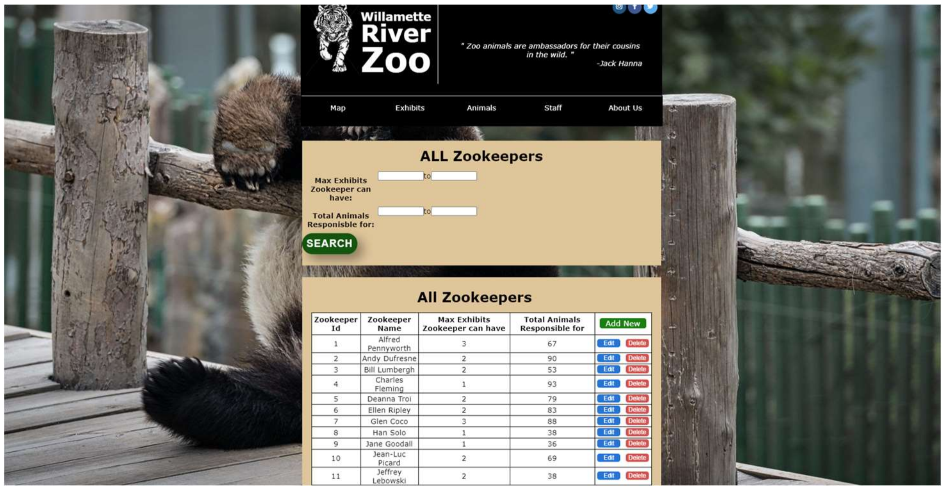
Species Name:

Exhibit that Species are in: Arctic Circle

Wild Population:

ADD

9. Staff > All Staff (SELECT/CREATE/**UPDATE/DELETE** in `zookeepers` table)

   a. 

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ALL Zookeepers

Max Exhibits Zookeeper can have: to

Total Animals Responisble for: to

SEARCH

All Zookeepers

Zookeeper Id	Zookeeper Name	Max Exhibits Zookeeper can have	Total Animals Responsible for	Add New
1	Alfred Pennyworth	3	67	Edit Delete
2	Andy Dufresne	2	90	Edit Delete
3	Bill Lumbergh	2	53	Edit Delete
4	Charles Fleming	1	93	Edit Delete
5	Deanna Troi	2	79	Edit Delete
6	Ellen Ripley	2	83	Edit Delete
7	Glen Coco	3	88	Edit Delete
8	Han Solo	1	38	Edit Delete
9	Jane Goodall	1	36	Edit Delete
10	Jean-Luc Picard	2	69	Edit Delete
11	Jeffrey Lebowski	2	38	Edit Delete

10. Staff > Zookeepers to Exhibits (SELECT for `zookeepers_exhibit` table)