



InVEST

integrated valuation of
environmental services
and tradeoffs

Free. Open source.
<http://www.naturalcapitalproject.org>

natura
capita
PROJECT

INVEST MODEL STRUCTURE

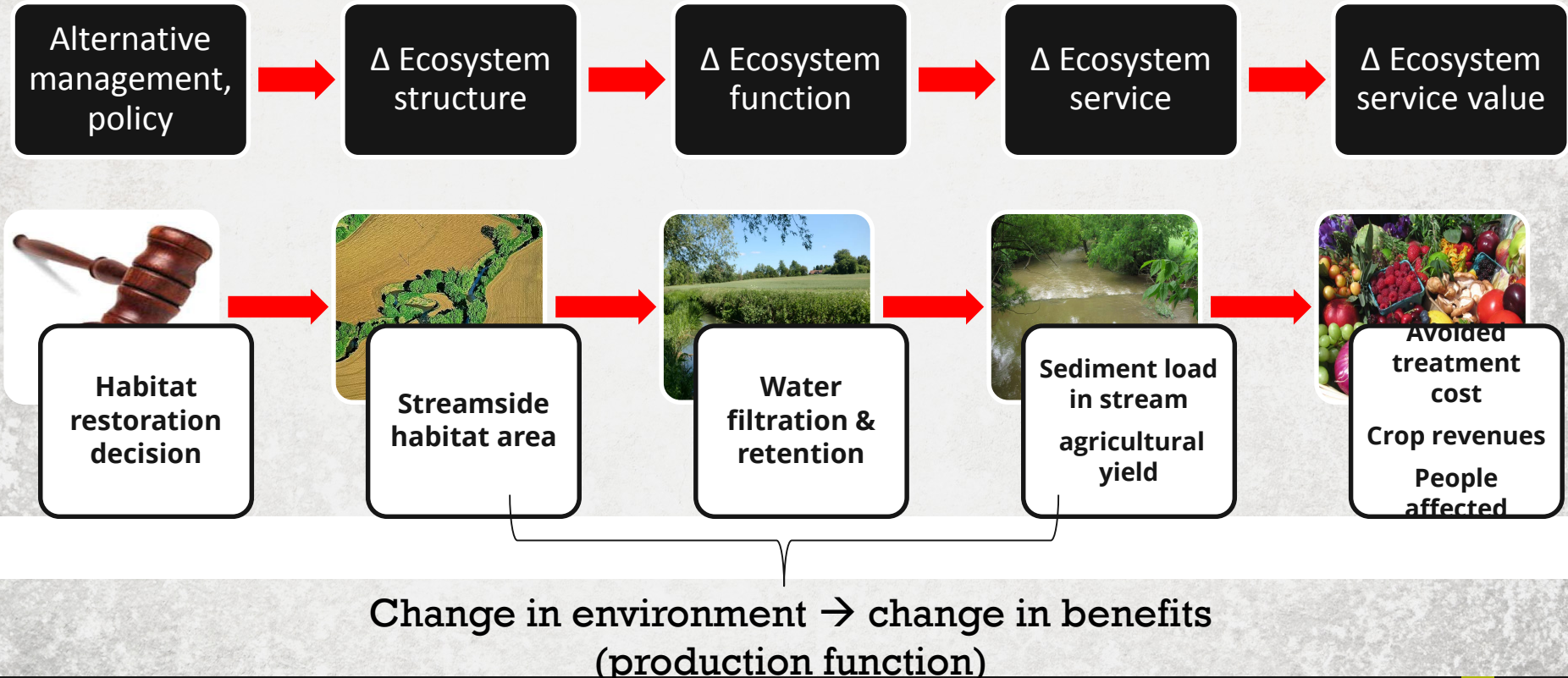
Supply → Service→ Value

Ecological functions
Ecosystem elements ->
Spatially-explicit
production functions

Supply
+
Location and activity of
beneficiaries

Service
+
Social preference

Production Functions and Ecosystem Services



INVEST MODELS – FRESHWATER & TERRESTRIAL

Habitat quality & Risk assessment

Water yield for hydropower production

Erosion control: reservoirs and water quality

Water purification: nutrient retention

Carbon storage & sequestration

Managed timber production

Crop pollination

Coming Soon – Agricultural Production



INVEST MODELS - MARINE

Recreation



Aquaculture



Fisheries



Coastal protection



Renewable energy (wave and wind)



Scenic quality



Water quality

Habitat risk

assessment
Blue Carbon

Spatial data

Land use/
Land cover



Soil type



Topography



Cities



Infrastructure

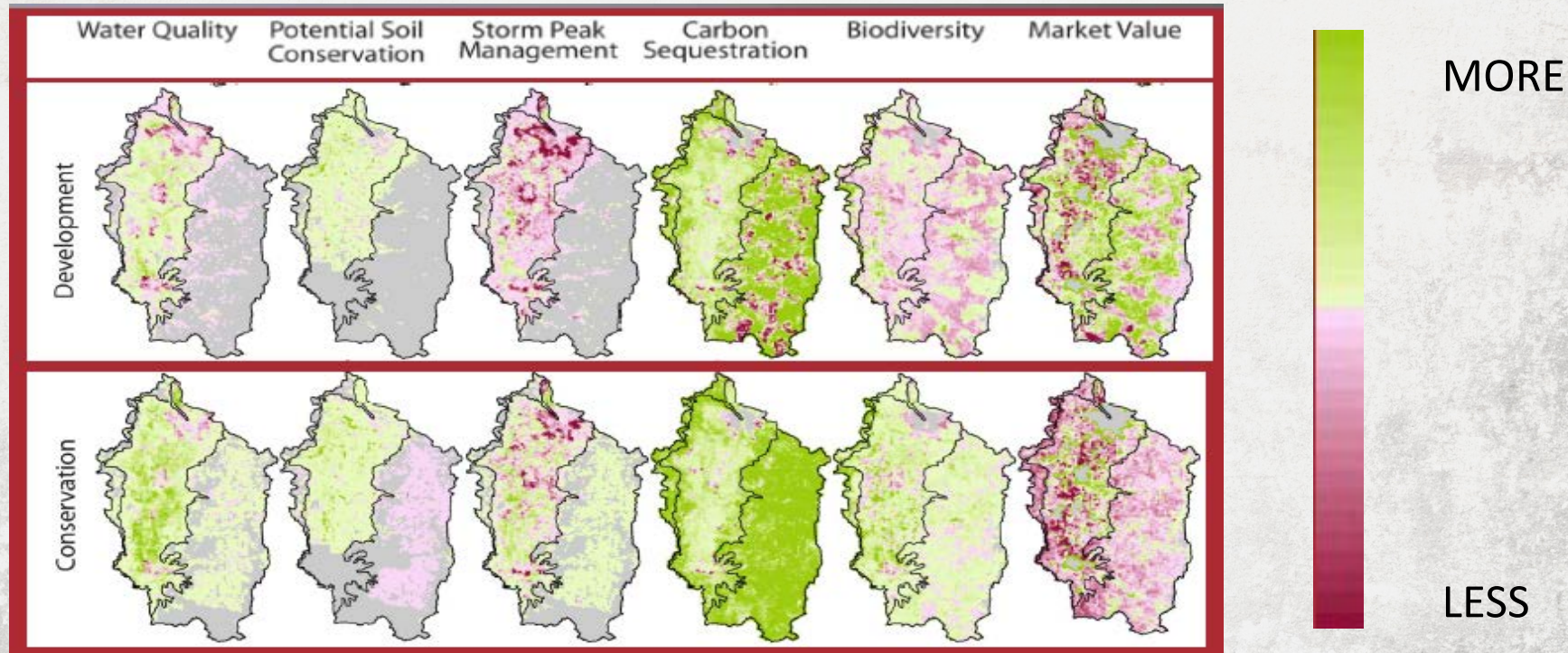


Associated data

Examples:

- Carbon pools by land use/land cover and soil
- Habitat suitability by land use/land cover
- Market value of timber or carbon

OUTPUTS: QUANTIFYING & MAPPING



- 1) Relative or absolute measures
- 2) Biophysical amount or value

ECONOMIC VALUATION METHODS

- Market valuation
 - Carbon
 - Timber
 - Non-timber forest products
- Avoided damage costs
 - Water purification
 - Flood mitigation
 - Avoided reservoir sedimentation
- Production Economics
 - Water for irrigation
 - Pollination of agricultural crops



Sediment erosion can:

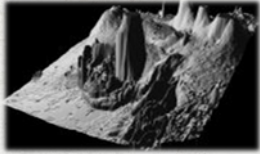


- Increase reservoir dredging costs
- Increase water treatment costs
- Decrease agricultural productivity

SEDIMENT EXAMPLE: BIOPHYSICAL INPUTS



Land use/Land cover
+ associated factors affecting
soil loss and retention



Slope



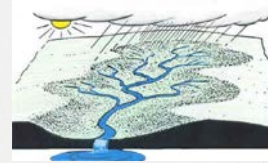
Rainfall erosivity



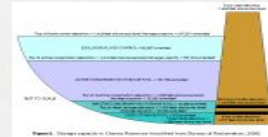
Soil erodibility



Streams

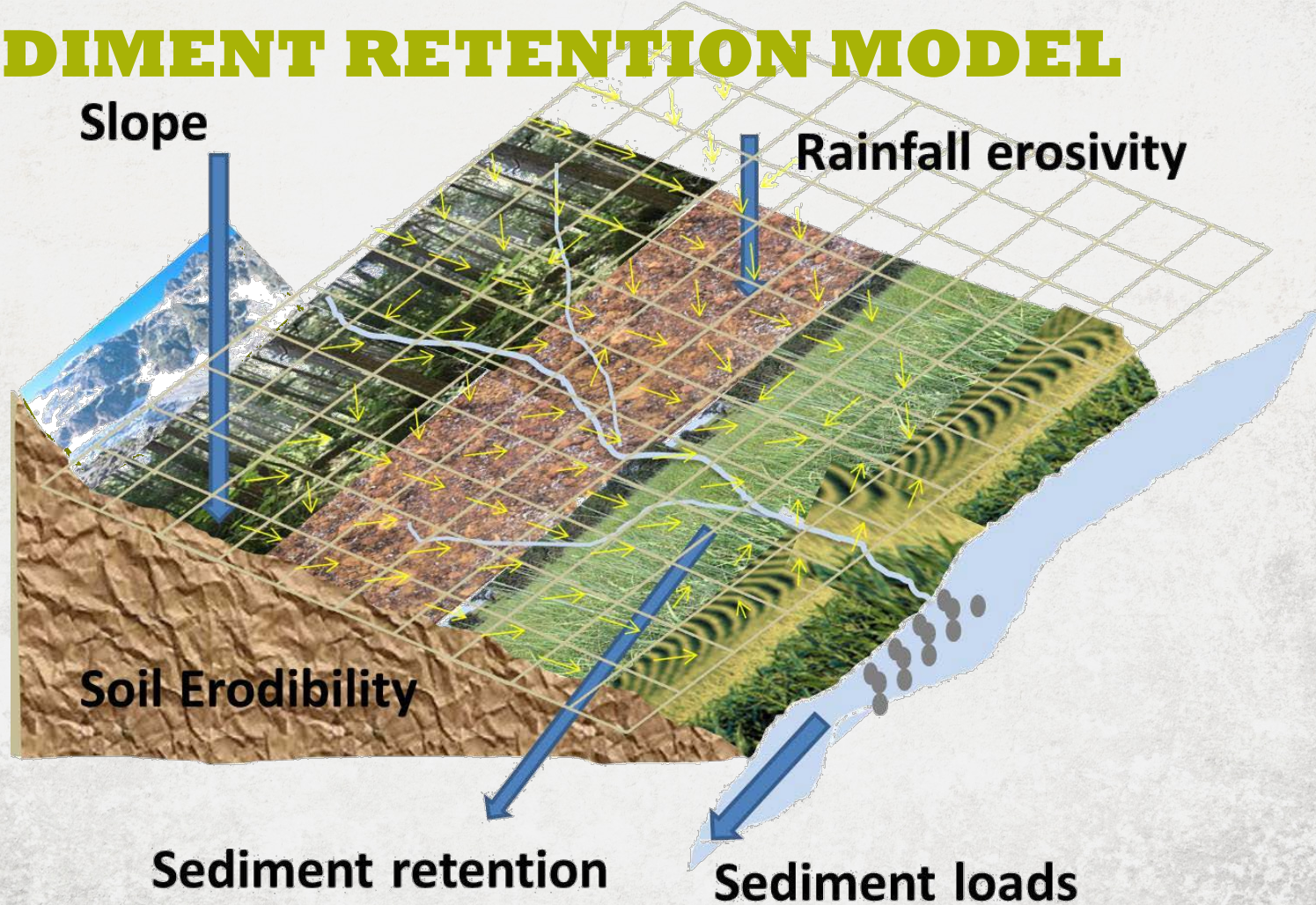


Watersheds

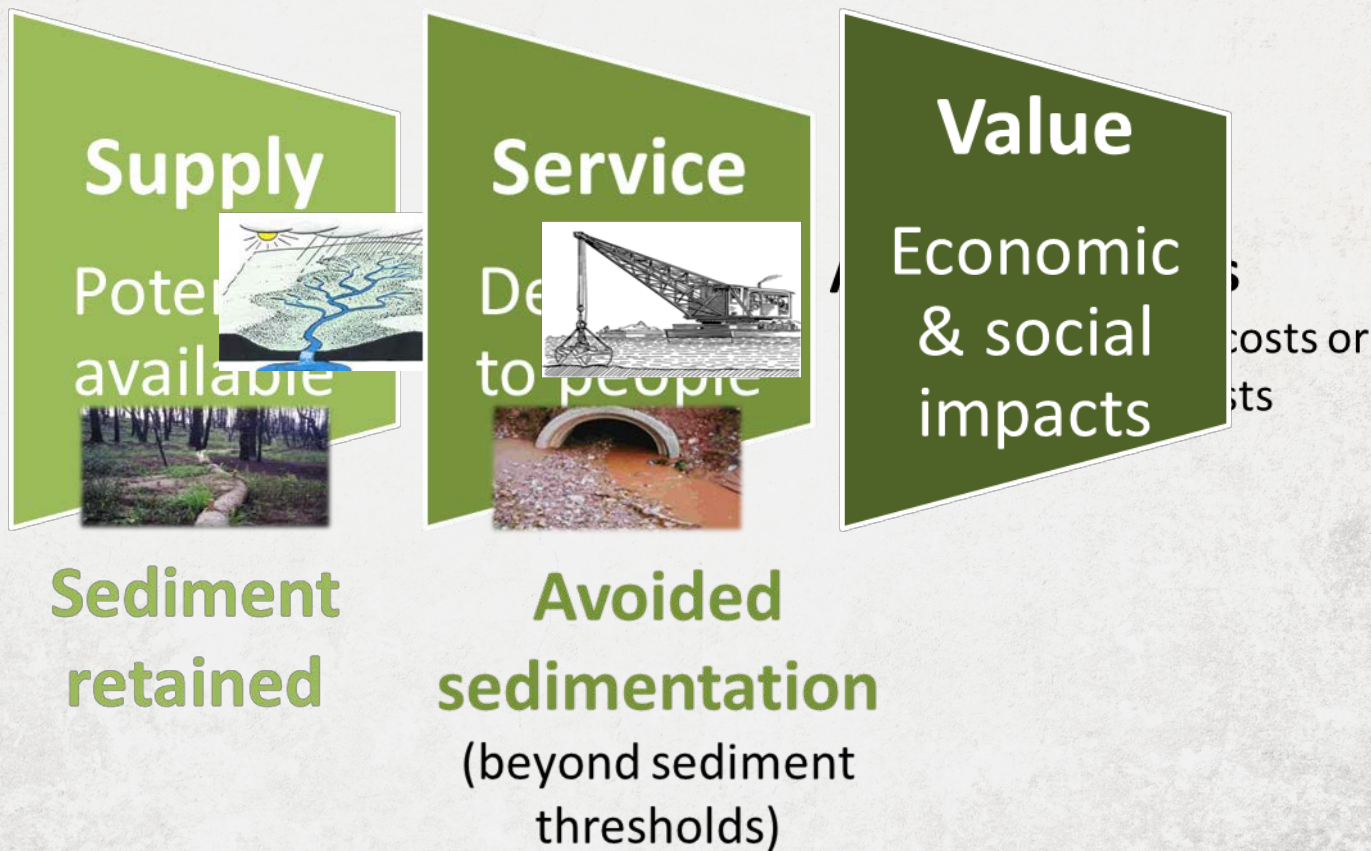


Sediment thresholds
(of reservoirs or water
quality requirements)

SEDIMENT RETENTION MODEL

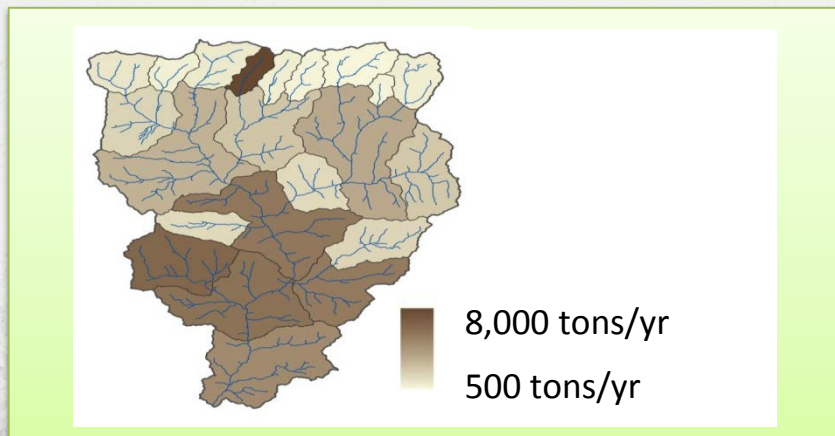


SEDIMENT – SUPPLY, SERVICE, VALUE



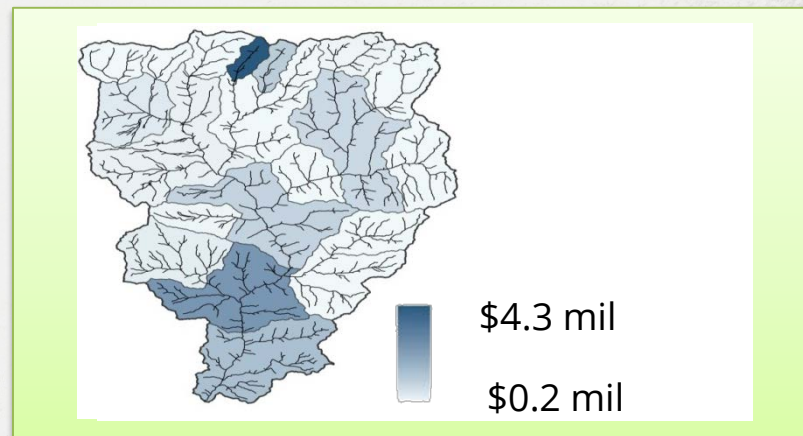
SEDIMENT EXAMPLE: OUTPUT

AVOIDED SEDIMENTATION PER SUBWATERSHED



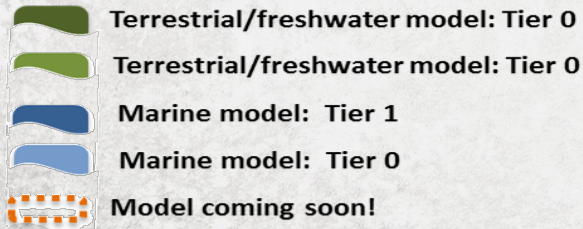
- Where are the sediment sources?
- Where is sediment retained?
- How much is retained?

AVOIDED TREATMENT COST PER SUBWATERSHED



- What is the value of this retention?
- How does this differ between scenarios?

**natural
capital**
PROJECT

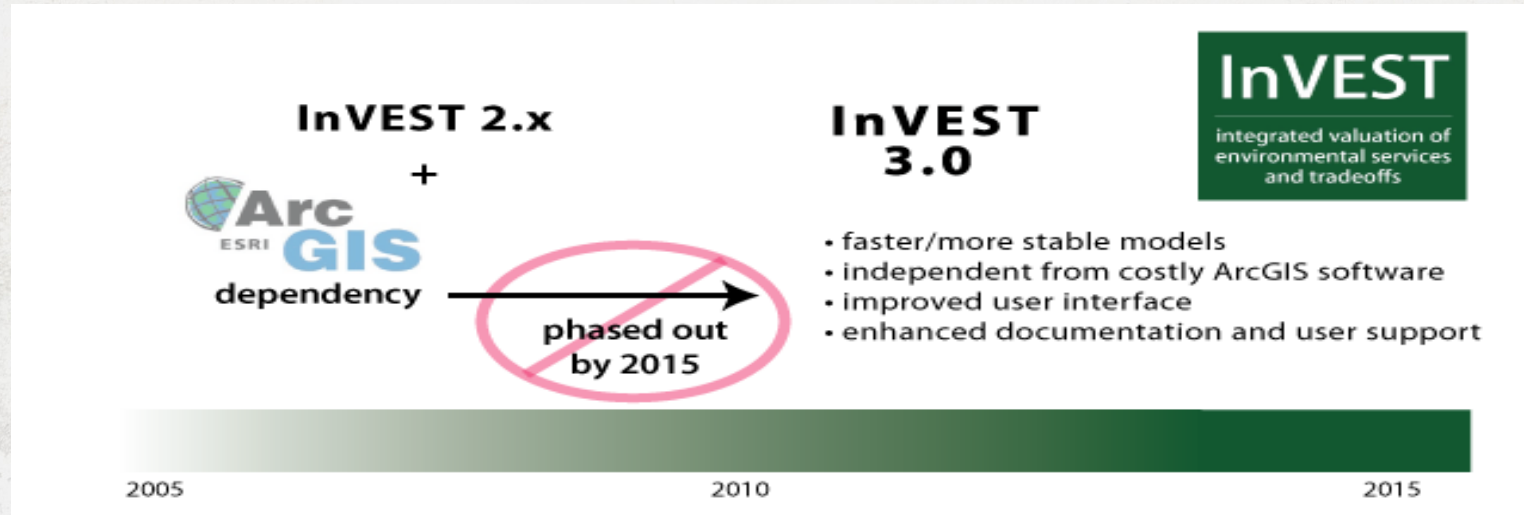


Introduction to InVEST • 3 June, 2015

WHY INVEST?

- Flexible scale
- Applicable globally
- Scenario based
- Relevant to many kinds of decisions
- Biophysical and economic
- Multi-services comparisons
(synergies and tradeoffs)
- Interchangeable and comparable with other model outputs

INVEST PROGRESSION



PREPARING & VISUALIZING DATA



www.arcgis.com
License required



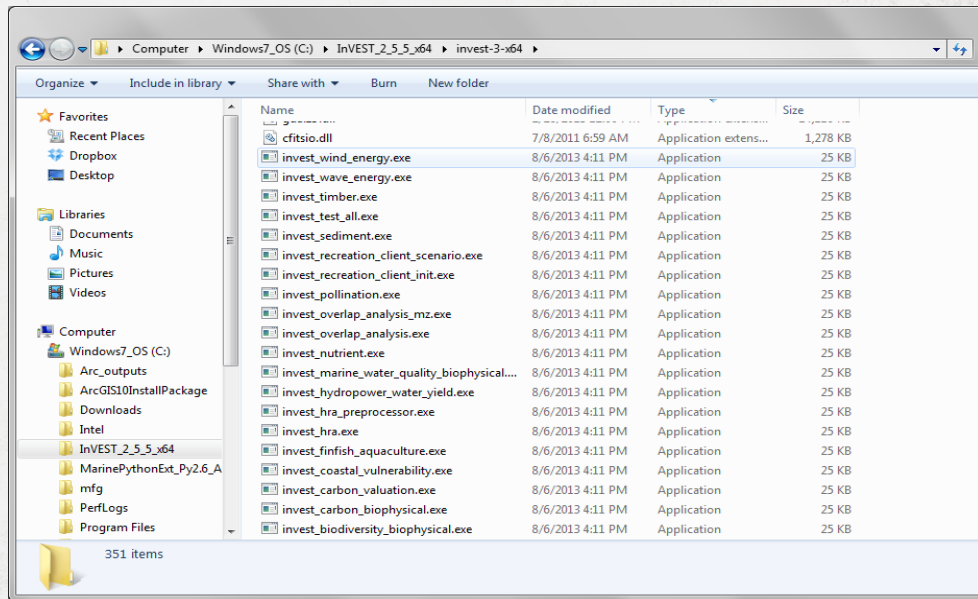
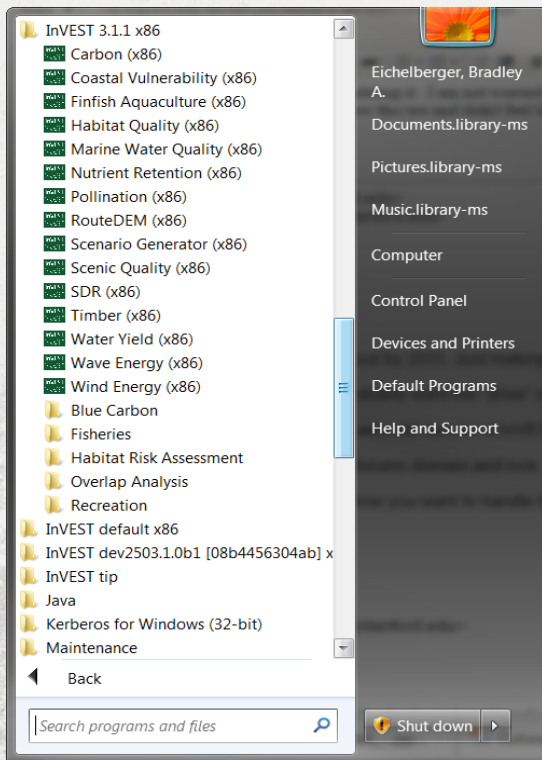
www.qgis.org
Free

LAUNCHING InVEST

Access InVEST through
your Windows Start menu...

-or-

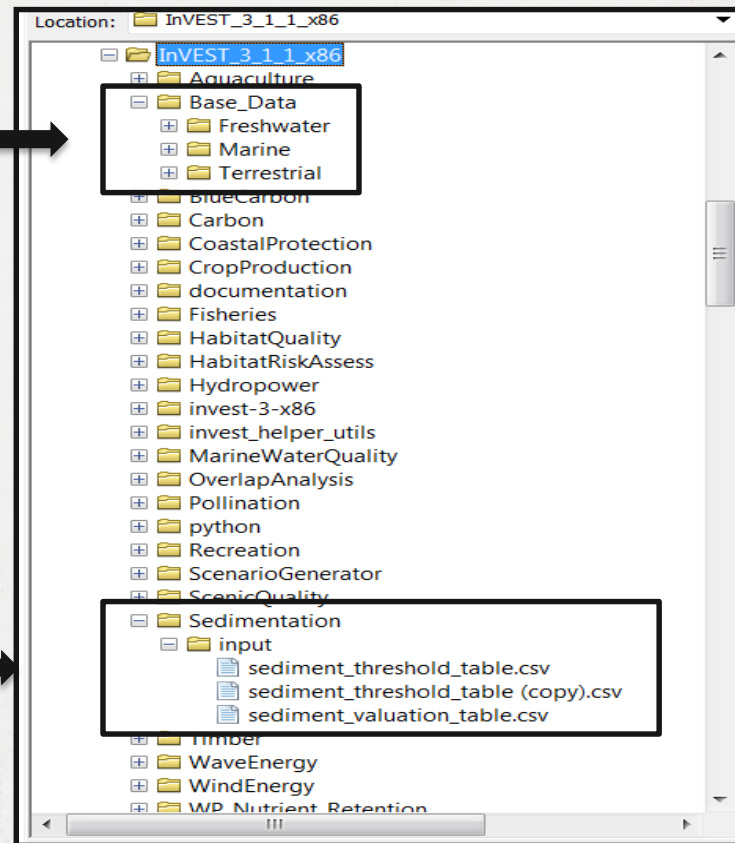
...through your hard



INVEST FILE STRUCTURE

Base data
(common layers)
for each toolset

Sample data for
each model



USER FORUM

- Ask any question
 - Model troubleshoot
 - Trainings
 - Project support
 - etc.
- Monitored daily by our scientists, analysts, and engineers!

The screenshot shows the NatCap Forums website. At the top, there's a dark header with the 'natural capital PROJECT' logo on the left, a search bar with the text 'enter your search terms', and links for 'Discussions', 'Sign up', 'Have an account?', and 'Sign in' on the right. Below the header, the main content area is divided into two columns. The left column is a sidebar with a 'Home' link, a welcome message 'Howdy, Stranger!', a prompt to get involved, 'Sign In' and 'Register' buttons, a 'Categories' section with a search bar and 'Recent Discussions', and a list of categories with their respective post counts: All Categories (502), General (134), MOOC (3), Gulf Coast (2), Freshwater Models (110), Forum Feedback (6), Marine Models (68), MSP Toolkit (1), Pre/Post-Processing (21), and MAFE-T (0). The right column is titled 'NatCap Forums' and features a 'General' section with five discussion threads: 'Question on InSEAM' (12 views, 2 comments), 'User guide not available' (13 views, 2 comments), 'streamline is been cut' (13 views, 2 comments), 'InVEST 3.2.0 released' (9 views, 0 comments, marked as an announcement), and 'Nutrient retention and Calibration' (131 views, 9 comments). Below this is a 'MOOC' section with three threads: 'Welcome NCP102 Learners!' (13 views, 0 comments), 'Course Progress Accuracy?' (150 views, 7 comments), and 'Welcome NCP-101 Learners!' (250 views, 3 comments). A 'Gulf Coast' section is partially visible at the bottom. A 'More Discussions' link is located at the bottom right of the 'General' section.

RESOURCES AVAILABLE TO HELP:

- InVEST Trainings (you're here! Great start.)
- Annual Meeting @ Stanford
- InVEST User Guide
- InVEST Model Training Videos
- Online training resources (NCP101 MOOC)
- Virtual InVEST User Community
- NatCap Forums
- Newsletter
- Social Media (Twitter: @NatCapProject, Facebook, Google+)
- Email : invest@naturalcapitalproject.org

www.naturalcapitalproject.org

What we'll be doing next:

- **Q&A**
- **Case studies using InVEST from the Department of Defense**

