

Studying Ecosystem Services from Space



[Ecoserve](#) recently completed a study, [Earth Observation for Ecosystem Service Valuation](#), that uses remotely sensed data from satellites and InVEST models to evaluate ecosystem services. This project was funded by the [European Space Agency](#), and highlights the benefits of earth observation products for the valuation of ecosystem services. A summary of the project can be found [here](#).

PostDoc Opportunity

Steve Polasky and NatCap are teaming up with Peter Reich's forest ecology lab at the University of Minnesota to offer a [new post-doc position on forest ecosystem services](#) at UMN.

Software tools:



[InVEST](#) is a free and open-source software suite developed by the Natural

Valuing Natural Heritage in the Chiloé Archipelago

BUILDING CAPACITY TO USE NatCap's APPROACH AND TOOLS

NatCap is working with [CECPAN](#) to incorporate ecosystem services into land-use planning decisions that will [protect natural and cultural heritage in the Chiloé archipelago](#) in southern Chile. Our relationship with CECPAN is unique; instead of NatCap staff engaging deeply, our focus is explicitly on capacity-building to empower CECPAN to use our approach and tools. We have provided guidance on project design, trained CECPAN staff in our approach and tools, helped troubleshoot, and assisted with the communication and interpretation of results. But it is CECPAN staff—experienced ecologists who are intimately familiar with local systems, data, and political processes—that is conducting most of the work.

CECPAN's largest initiative aims to achieve an official designation of the Lacuy Peninsula, an area of significant natural and cultural heritage, as a Zone of Tourist Interest. Colonies of Humboldt and Magellanic penguins draw more than 19,000 visitors annually to this region. Consequently, tourism and recreation constitute a vital piece of the local economy. A large portion of the peninsula is currently under consideration for coastal wind-farm development and CECPAN is working to ensure that potential impacts to recreation, shorebirds, and local communities are taken into account during the decision-making process. To that end, they have used the InVEST Recreation and Scenic Quality models to demonstrate the importance of the region for recreation and tourism now and in the future. Ultimately, CECPAN hopes that designation of the peninsula as a Zone of Tourist Interest will help conserve the coastal ecosystems that support local communities.

Elsewhere in the archipelago, CECPAN is demonstrating the value of rural land in an effort to regulate urban sprawl and preserve small-scale farming. Chiloé's ancestral farming practices are recognized by the FAO and UNESCO as a Globally Important Agricultural Heritage System, famed for growing over 200 varieties of native potatoes. CECPAN is working with a number of agricultural, development and forestry groups as well as local farms to promote farming practices that reduce soil erosion, including hedges of native forest. CECPAN applied the InVEST Sediment Retention model to show the benefits of a best management practices scenario. This collaboration aims to secure and leverage government funds to promote practices that conserve soil, and, in turn, agricultural heritage. It has been a real treat to get to know and work with our new friends at CECPAN, and we continue to support them when needed and cheer their science and policy successes from afar!



Tourists flock to Chiloé to see colonies of Magellanic penguins along the shore. Image: (cc) Pablo Caceres

Capital Project. [InVEST 3.0.1](#) was released on April 21st, 2014. The latest update fixes a few bugs and contains performance and usability updates across all the models. We recommend that users upgrade to this version which can be downloaded [here](#).



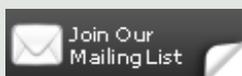
RIOS is a software tool that helps design cost-effective investments in watershed services. [RIOS 1.0.0b8](#) was released on November 6, 2013.

For help using InVEST and RIOS, visit the [NatCap Forums](#), our online user community.

Newsletter Archive

Check out NatCap's previous newsletters in our [Newsletter Archive](#).

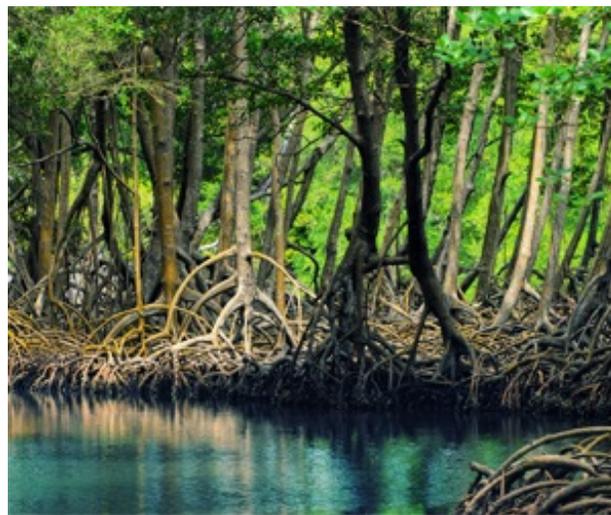
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Coastal Blue Carbon

A NEW InVEST MODEL

Responding to demand from many partners and collaborators, we have built a model to map and value carbon stored in marine and coastal systems. Available in InVEST version 3.0.1, [Coastal Blue Carbon](#) is InVEST's newest model. The model maps, measures, and values carbon storage and sequestration in coastal and marine habitats such as mangroves, seagrasses, and salt marshes. Like all InVEST models, it is spatially explicit and can help inform land and ocean use planning decisions, particularly those related to coastal development. The model is the first of its kind to allow users to include disturbance information (e.g., where mangroves are harvested for fuel versus cleared for shrimp ponds) directly in the model for more accurate estimates of CO₂ emissions over time.



Mangrove forests sequester carbon while protecting coasts from erosion and providing nursery habitat for fish.

Image: (cc) Anton Bielousov

We have applied the InVEST Coastal Blue Carbon model in Galveston Bay and Freeport, Texas, and in southern Belize to identify and value sea-level rise adaptation options in marine and coastal ecosystems. In order to ensure the model works well in other environments, we are currently testing it in mangrove forests in Vietnam and with seagrass beds in New Zealand. We are also in the process of assembling a database of carbon storage values and accumulation rates for mangroves, seagrasses, and salt marshes that can be used with the model. This global literature review should be available to users within the next few months.

Recent Press and Publications

Two new studies came out this month from the University of Minnesota and the Natural Capital Project on food production and the environment. The most recent paper, published this week in [Science](#), suggests ways we could improve global food security and the environment by better use of existing farmland. The study found that we could feed 3 billion more people if we used existing farmland more efficiently, and that cutting waste by even modest amounts would feed millions.



Conversion of grassland to crops contributes to water contamination. Image: (cc) James Watkins

Another paper, published in the journal [Environmental Research Letters](#), outlines the economic costs associated with groundwater pollution along with threats to overall water quality and ecosystem services. It shows that conversion of grasslands to agricultural fields is contributing to groundwater contamination in Southeastern Minnesota, and predicts that private water well contamination is likely to increase by 45% in the near future.

[Leverage points for improving global food security and the environment](#)
Paul C.West, James S.Gerber, Peder M. Engstrom, Nathaniel D.Mueller, Kate A.Brauman, Kimberly M. Carlson, Emily S.Cassidy, Matt Johnston, Graham K. MacDonald, Deepak K.Ray, and Stefan Siebert.
Science. 18 July 2014: vol. 345 no. 6194 pp. 325-328

[Land-use change and costs to rural households: a case study in groundwater nitrate contamination](#)

Bonnie L Keeler and Stephen Polasky
Environmental Research Letters. June 30, 2014, Vol 9(7).

[New study shows conversion of grasslands to agriculture in Southeastern Minnesota contributes to groundwater nitrate contamination](#)

University of Minnesota Discover - July 10th, 2014

[Crop switch could cost millions in water contamination](#)

MPR News, July 10, 2014, by Mark Steil

[How to boost food production but not emissions? Researchers identify key ways.](#)

The Christian Science Monitor, July 18, 2014, by Noelle Swan

[How can we feed billions more people?](#)

Newsweek, July 17, 2014, by Victoria Bekiempis

[Food used to fatten animals could feed 3 billion](#)

NBC News, July 17, 2014, by John Roach

[Sizing Down Food Waste: What's the worst thing to toss?](#)

NPR, July 17, 2014, by Michaela Doucleff

Other Press and Publications:

[Climate engineering reconsidered](#)

Barrett, S.; T.M. Lenton; A. Millner; A. Tavoni; S. Carpenter; J.M. Anderies; F. S. Chapin III; A.S. Crépin; G. Daily; P. Ehrlich; C. Folke; V. Galaz; T. Hughes; N. Kautsky; E.F. Lambin; R. Naylor; Karine Nyborg; S. Polasky; M. Scheffer; J. Wilen; A. Xepapadeas; A. de Zeeuw.

Nature Climate Change. July 2014, Vol. 4(7),pp. 527-529.

[Influence of watershed-climate interactions on stream temperature, sediment yield, and metabolism along a land use intensity gradient in Indonesian Borneo](#)

Carlson, Kimberly M.; L.M. Curran; A. Ponette-González; D. Ratnasari; P. Ruspita; N. Lisnawati; Y. Purwanto; K.A. Brauman; P.A. Raymond.

Journal of Geophysical Research: Biogeosciences. Published online June 13, 2014.

[Implementing the optimal provision of ecosystem services](#)

Polasky, Stephen, David J. Lewis, Andrew J. Plantinga, and Erik Nelson.

Proceedings of the National Academy of Sciences 111, no. 17 (2014): 6248-6253.

[Take Nothing but Pictures](#)

Stanford Magazine, July-August Issue, By Hugh Biggar

A full list of [news stories](#) and [publications](#) are available on our website. Access to full articles may require library access.

Thank you for your continued interest in the Natural Capital Project. If you have any questions, please feel free to contact us at invest@naturalcapitalproject.org.

