The detection of socio-economic impacts of protected area creation

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[4]Research Institute for Humanity and Nature, Japan	[8]University of Southern Oregon, USA

Building new tools for data sharing and re-use through a transnational investigation of the socio-economic impacts of protected areas (PARSEC).

Unique components:

1. *To conduct interdisciplinary, transnational synthesis science (***The Synthesis Strand***) while*

2. *testing novel approaches to the management and preservation of environmental and socio-economic data (***The Data Science Strand)**

Aim: these two strands will learn from each other, with 'domain' scientists better equipped to practice good data management, and data scientists better able to 'speak with' and respond to researcher priorities.

PARSEC : Building New Tools for Data Sharing and Reuse through a Transnational Investigation of the Socioeconomic Impacts of Protected Areas

Consortium Leaders: Nicolas Mouquet, David Mouillot, Alison Specht and Shelley Stall.

http://parsecproject.org

Objectives

(a) Predict the socioeconomic outcomes of natural protected areas (PAs) on rural communities using a novel combination of satellite imagery and artificial intelligence;

(b) Determine the influence of PAs on consumption expenditure and asset health of rural communities;

(c) Improve future environmental decision-making;

(d) Improve digitial connections between researchers, their funding, publications and data;

(e) Improve recommendations for the research data workflow and skills for research teams;

(f) Increase the number of citations to data sets and better attribute them to the data creator;

(g) Promote credit for open and FAIR data management and preservation for data reuse;

(h) Provide tools for researchers to view how the data they have deposited is used and cited.

Synthesis-science strand (David Mouillot)

WP1: Stratified sampling of 200 rural communities close to and far from natural protected areas (PAs) using matching algorithms.

WP2: Estimate socioeconomic conditions in the selected rural communities using remote sensing and artificial intelligence.

WP3: Using paired comparison tests determine whether proximity to a PA can improve socioeconomic outcomes. Identify contributing factors.

WP4: Dissemination (website, data sharing, scientific publications, newsletters, conferences).

improve data workflow for research teams

Data-science strand (Shelley Stall)

WP5: Develop leading practices, toolkits and workshops to support data sharing.

WP6: Improve capability for researchers to view how deposited data has been used, cited and reused (widget, web-accessible researcher profile).

FUNDING: 1258K€
Duration: 48 months

Participating countries
BRAZIL: University of São Paulo - FAPESP (P. Pizzigatti Corrêa) plus postdoc and technical support (FAPESP)
FRANCE: Foundation for Research on Biodiversity, University of Toulouse III - ANR (N. Mouquet)
JAPAN: National Institute of Information & Communications Technology, Research Institute for Humanity and Nature - JST (Y. Murayama)
USA: American Geophysical Union - NSF (S. Stall)
Cooperating partners
NCI, Australia (L. Wyborn), BGS, UK (H. Glaves)
Associated organisations
DataCite, ORCID, ESIP, RDA, EDI, WDS, AST, JWP, TNC

Synthesis strand

The detection of socio-economic impacts of protected area creation

The two pillars of the synthesis strand

Selection of protected areas (PA), adjacent settlements and mirror sites

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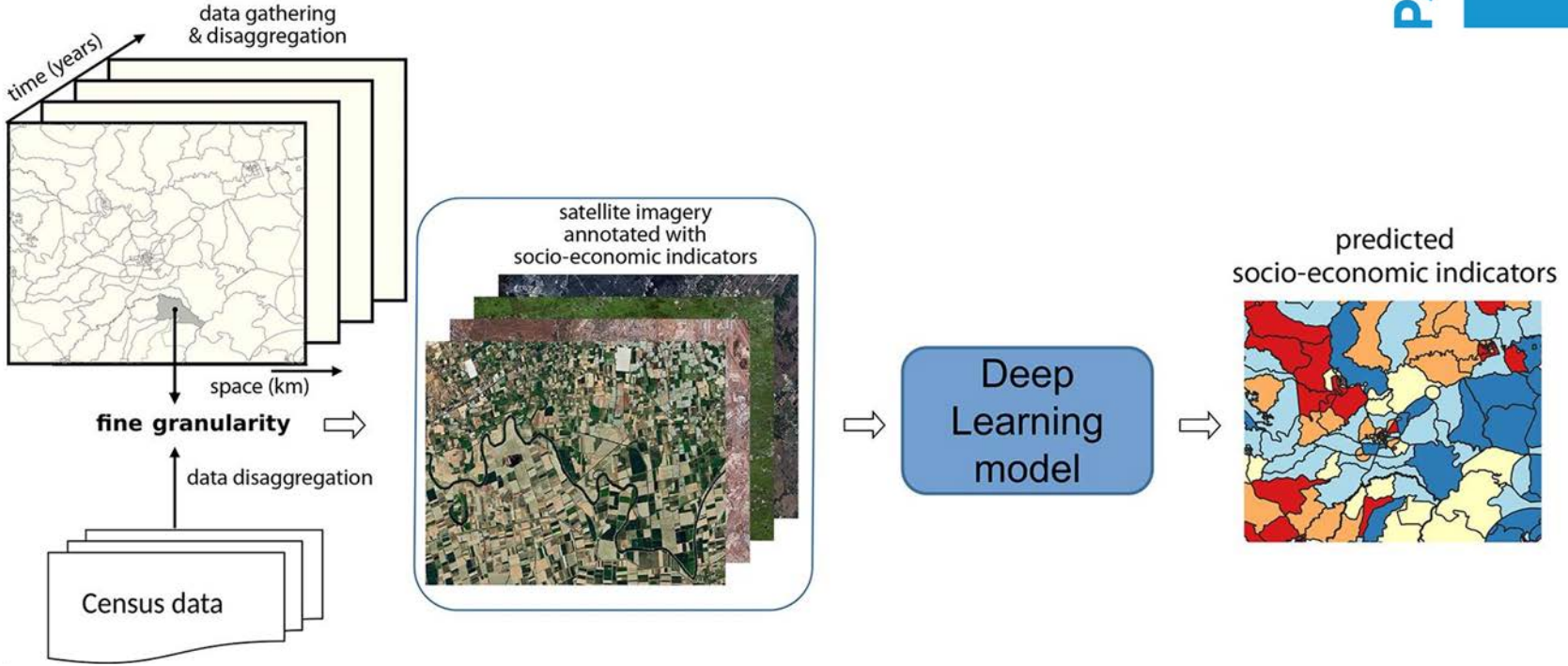
Selection of protected areas (PA), adjacent settlements and mirror sites

Model the socio-economic outcomes of the effects of creation of PAs on those settlements using remote sensing and AI

Inspired by: Jean et al. 2016. Science 353, 790–794. doi: 10.1126/science.aaf7894
Yeh et al. 2020. Nat Commun 11, 2583. doi: 10.1038/s41467-020-16185-w *et al.*

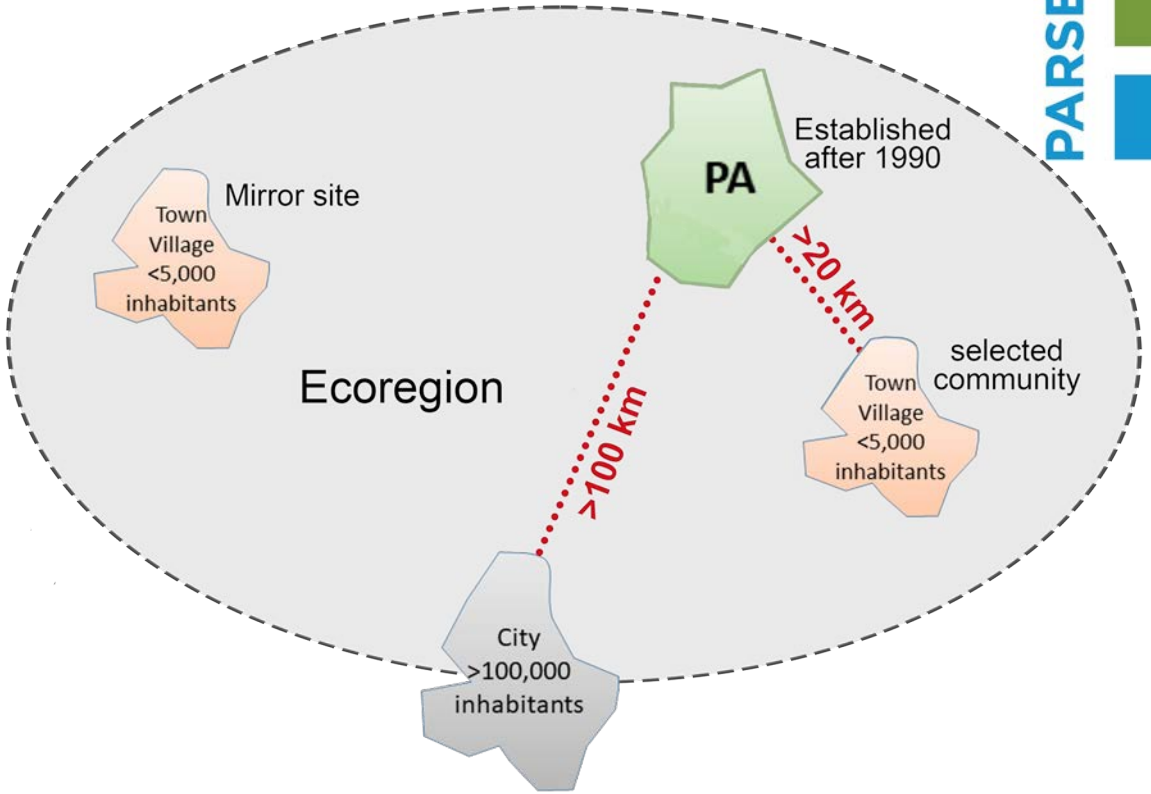
The planned workflow

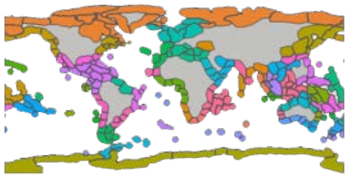


Site selection

- PAs listed on the IUCN WDPA
- adjacent towns < 5,000 people without other major influences

+ mirror sites (w/o PA)





Ecoregions:

Olson et al. (2001) BioScience 51, 933–938. doi: 10.1641/0006-3568(2001)051[0933:TEOTWA]2.0.CO;2
Spalding, et al. (2007) BioScience 57, 573–583. doi: 10.1641/B570707

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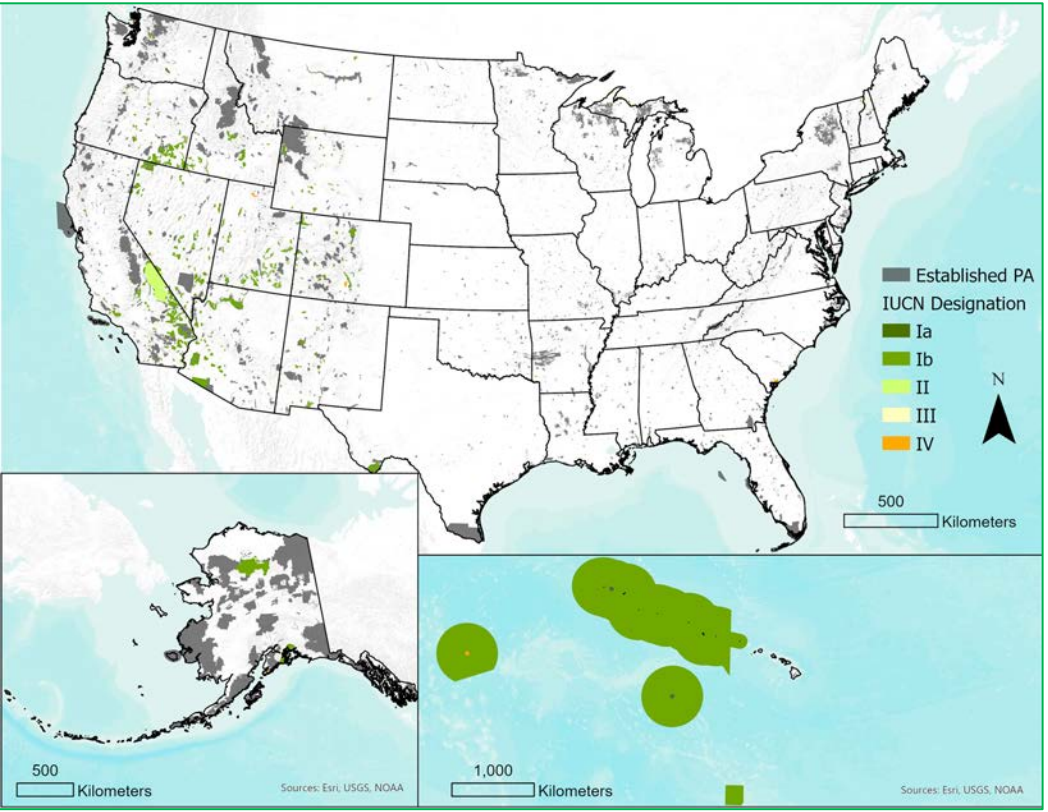

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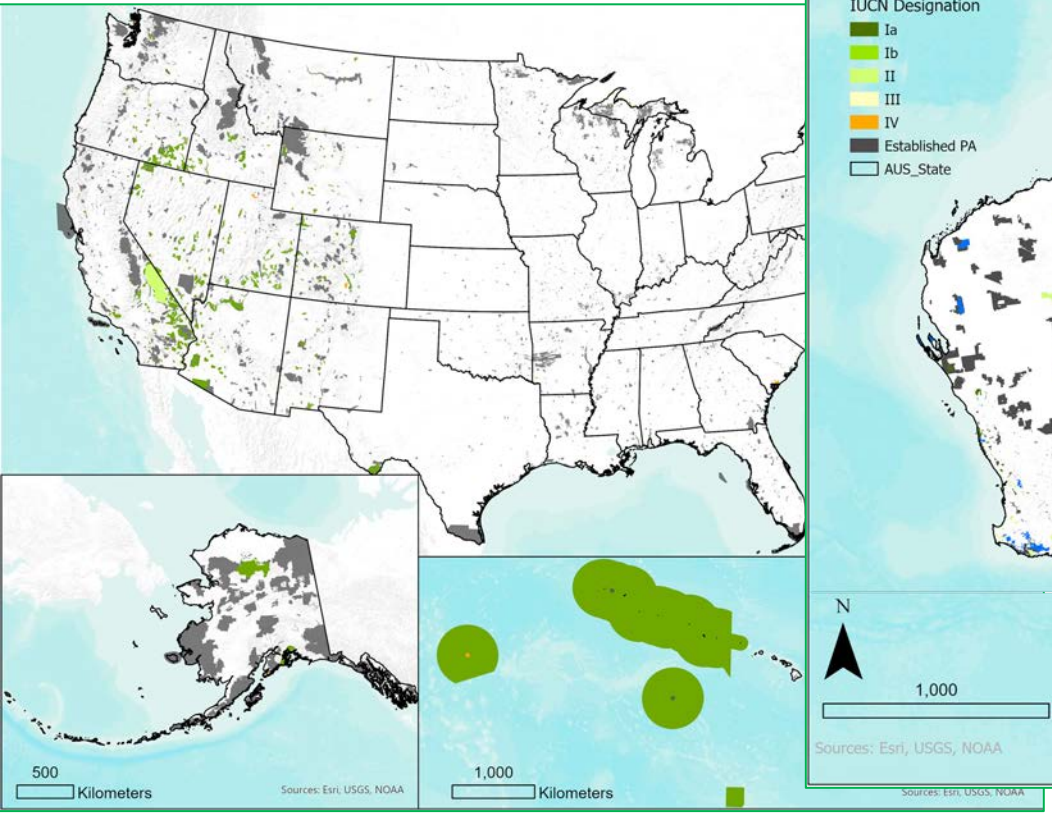

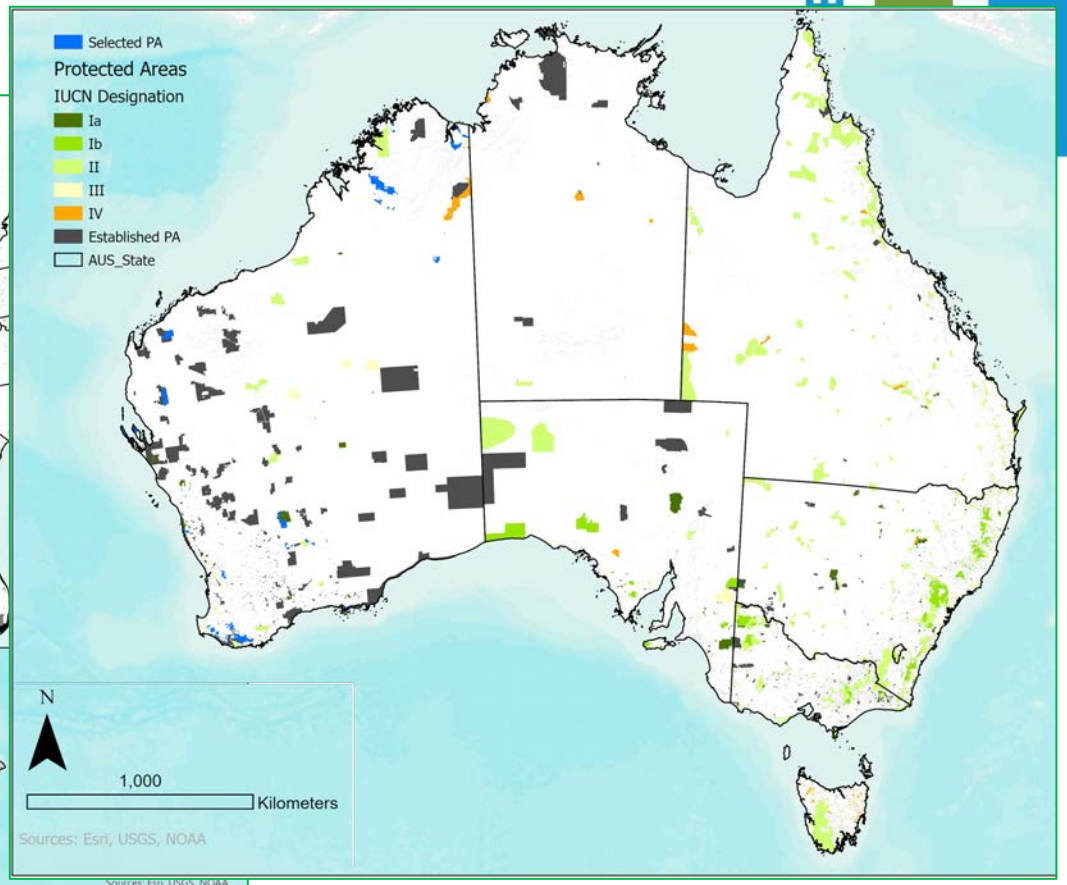

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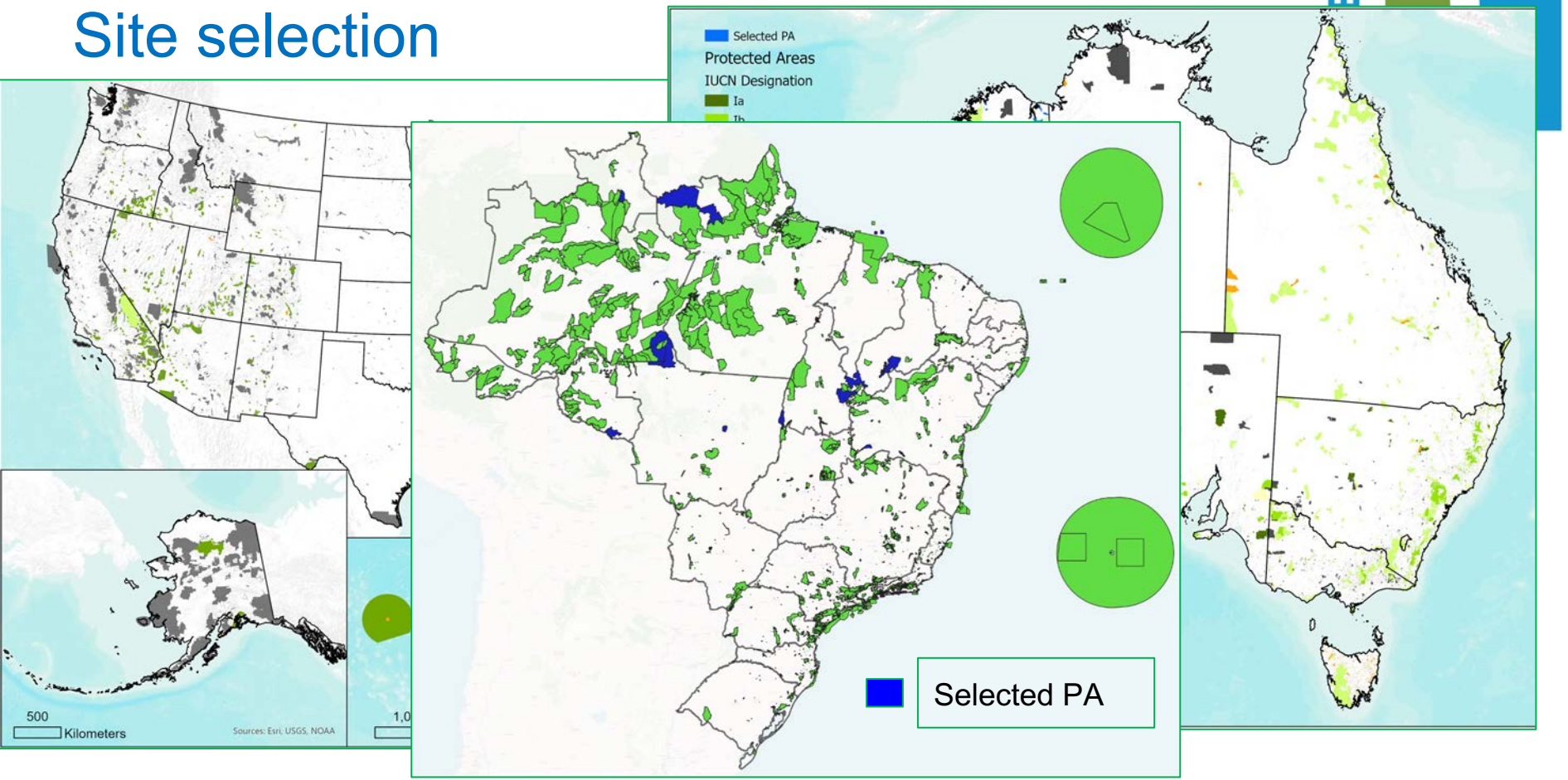
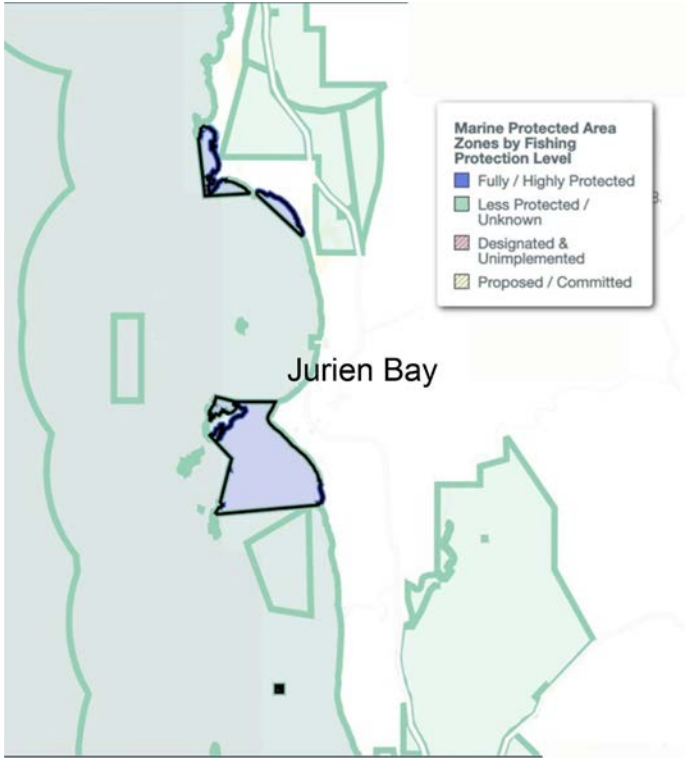
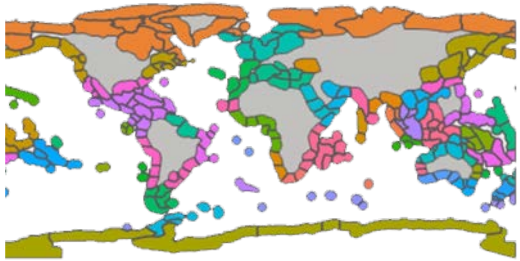


Detection of change



Status: Marine Park
Created: 2003/2005
Area: 778 km^2
Ecoregion: Houtman



Satellite data before and after the creation of the PA

Availability and type

Spatial resolution ($1m^2$ – $70m^2$)

Temporal frequency

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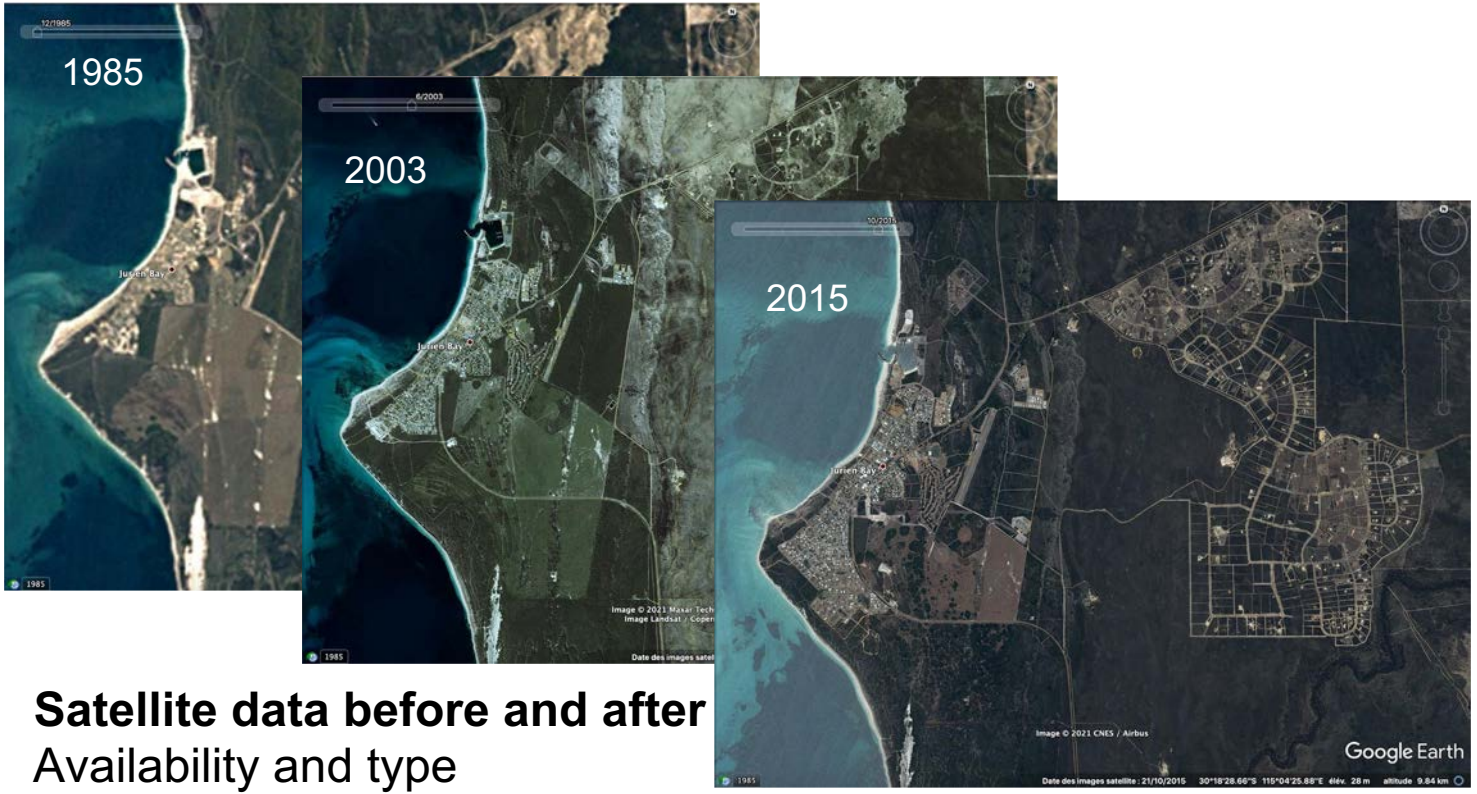

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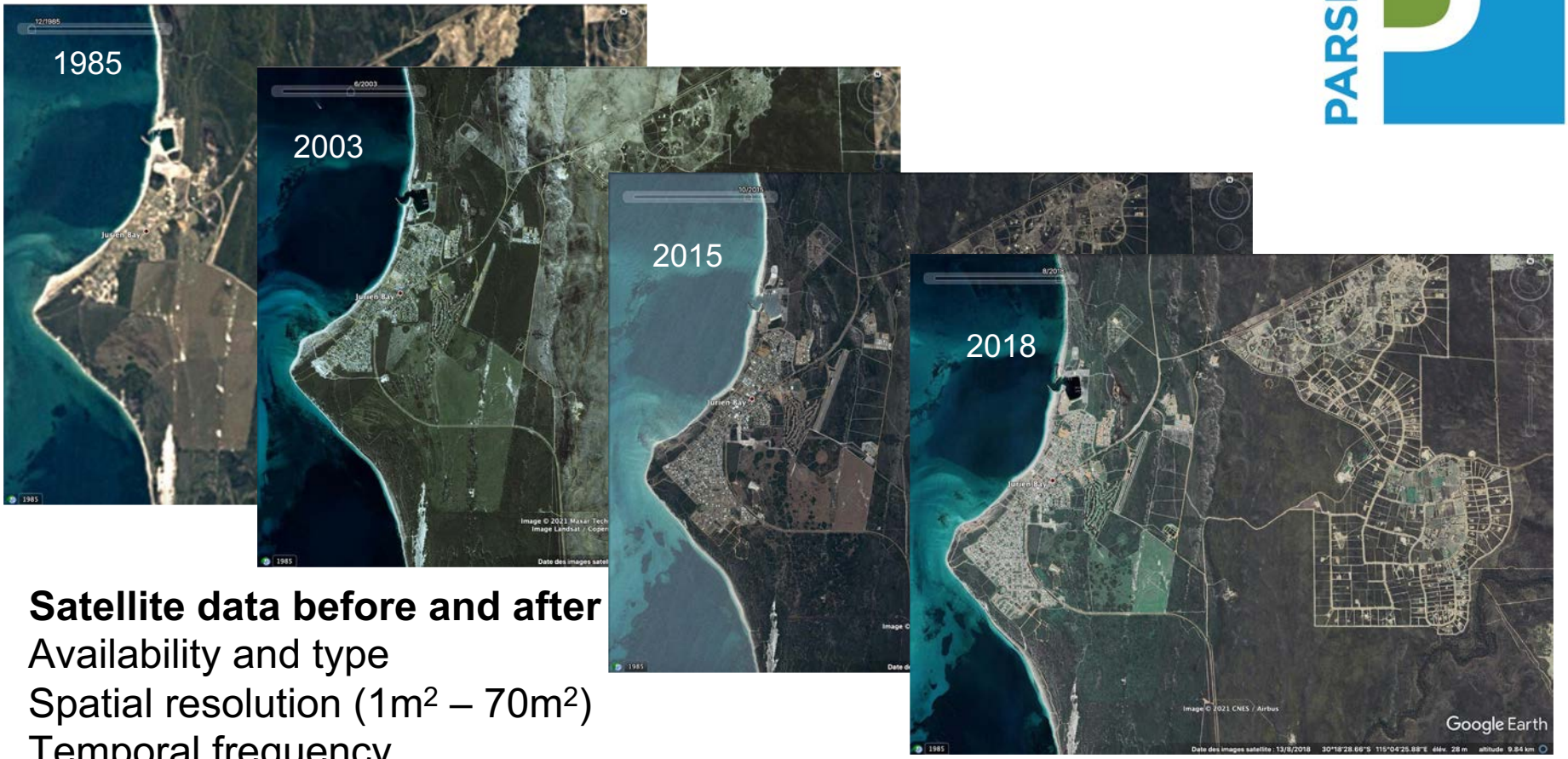

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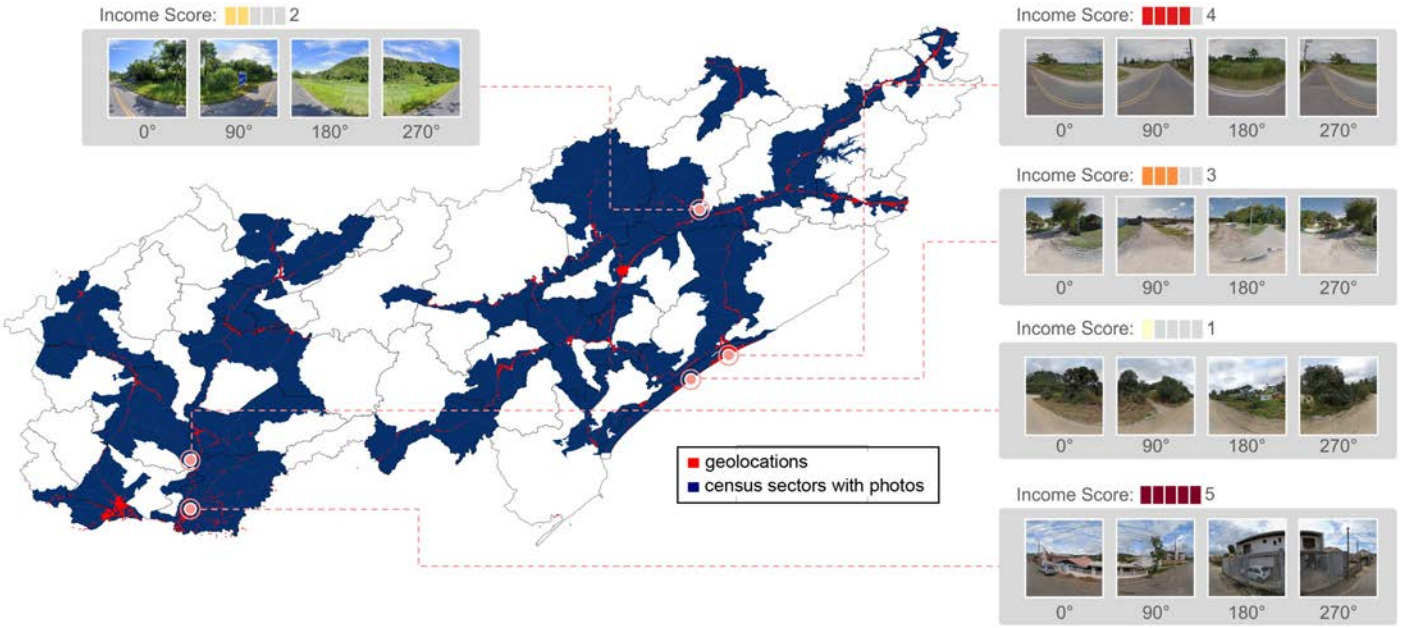

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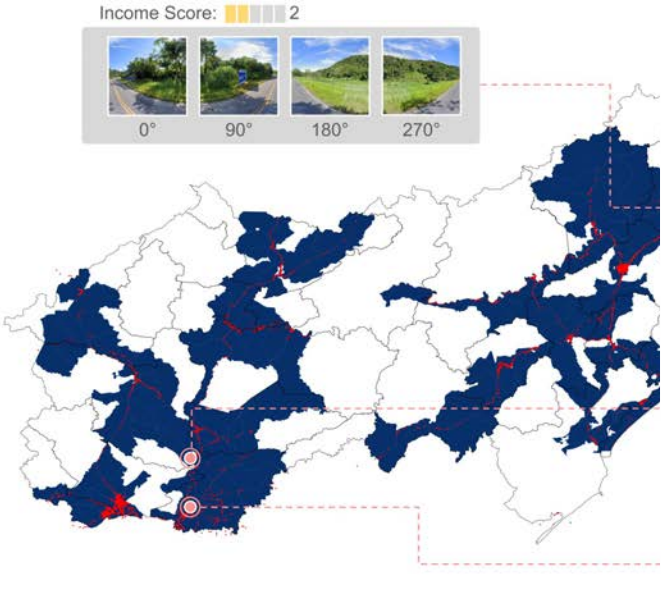

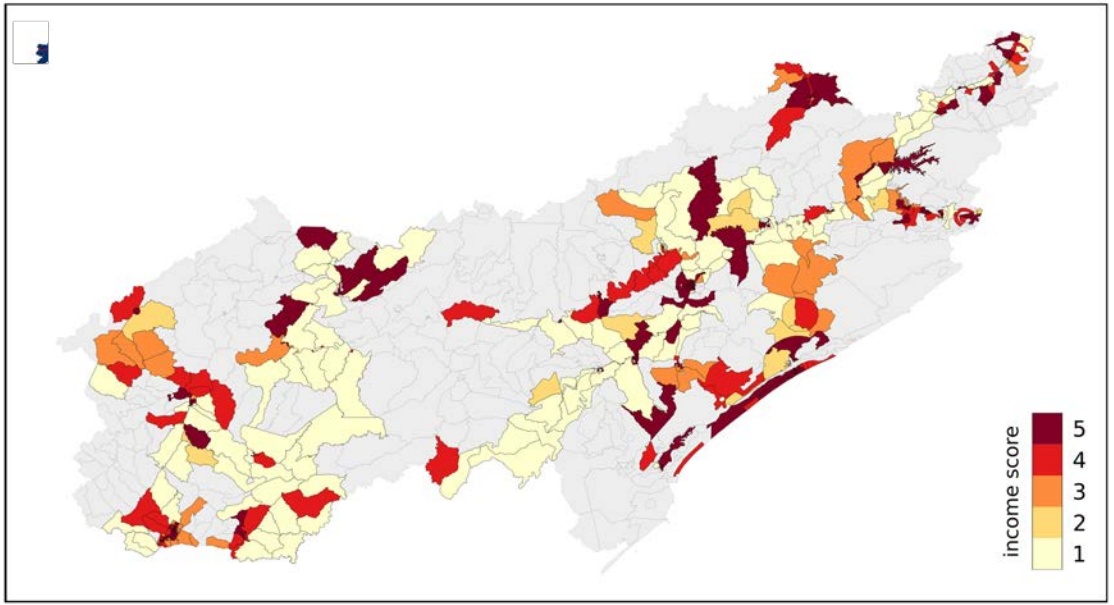

Data strand

Stall, Shelley. (2021, June). PARSEC: A FAIR Data Use Case with 40 Researchers, 6 Countries, and one Data Management Plan. Presented at the Sustainability Research & Innovation Congress 2021 (SRI2021), Brisbane, Australia: Zenodo. http://doi.org/10.5281/zenodo.4978466

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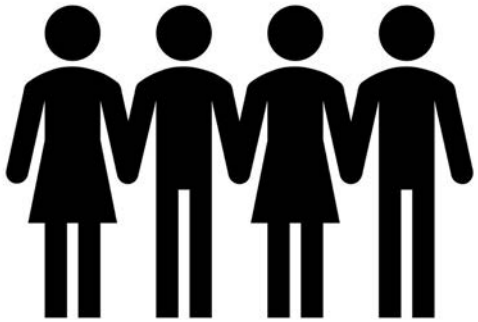
Data Science Strand Team Members

Data strand



Synthesis Science Strand Team Members

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Ensuring data management is to international standards…

- **Access** for all team members from all countries
- **Access/Control** to protect project information
- **Version control** of changes
- **Automated backups** to ensure no loss of data
- Ability to handle a range of **file sizes**
- Ability to honour **terms of use** for datasets/imagery
- Ability to limit/track access to files with **personal information/sensitive data**
- **Integrate with platforms** used by the project
- **Persistent** after the project

Establishing a common set of resources

- Material development and temporary storage location
    - Google Drive
- Team communications and information decimation tools
    - Email, Slack
- Dataset storage location during the project
    - Open Science Framework (AWS integration)
- Software development platform
    - GitHub
- Data preservation (including derived products) repository
    - Environmental Data Initiative
- Software preservation repository
    - Zenodo
- Training, workshop material preservation repository
    - Zenodo

Creating a timeline for the researcher

Once (during lifetime of researcher)

- ❑ **ORCID profile**
- \+ Activate the automatic updates from Crossref (published papers) and DataCite (published datasets and other digital objects.
- \+ More info: http://bit.ly/ORCID_Trust

Weekly

- ❑ Track
  - ❑ **datasets** created,
  - ❑ **datasets used**,
  - ❑ **workflow/provenance**

Monthly

- ❑ Publish and Report **conference presentations** and **posters**
- ❑ **Deposit and preserve**
  - ❑ Datasets
  - ❑ Software

  for peer-reviewed papers and supporting digital objects
- ❑ Report **publications with citations to datasets, software, and other digital objects**

Quarterly

- ❑ Update your ORCID profile
- \+ Ensure accurate and complete to ensure proper credit

Desired outcome:

not only a good scientific product but also
a workflow and product that is transparent, open, and reproducible

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marine biodiversity exploitation & conservation
Thankyou
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BELMONT FORUM
The Nature Conservancy
Powell Center
NSF
WORLD DATA SYSTEM
SIP
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