

New partnerships and approaches to generate greater returns on fisheries research and management investments



Ian Dutton



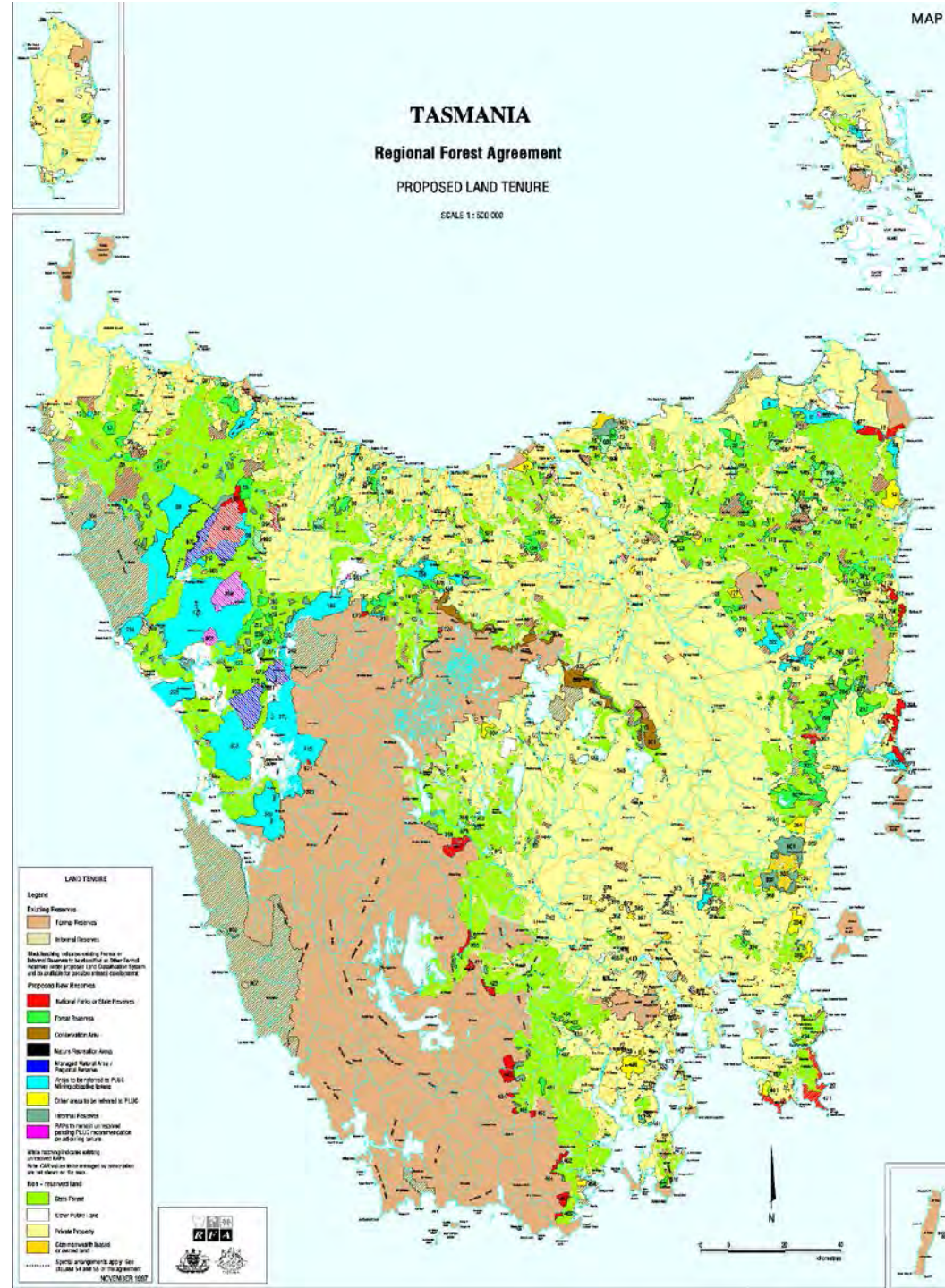
www.nautilusii.com
[@NautilusImplnv](https://twitter.com/NautilusImplnv)

**Kenai Peninsula Fish
Habitat Partnership
Science Symposium**

April, 2017

A little
personal
reflection...

What does it
take to sustain
quality of life in
Tas. and AK?



Tasmania:

- 26,410 sq. miles
- 50.1% in parks
- Private land 40%
- 513,400 people

vs

Alaska:

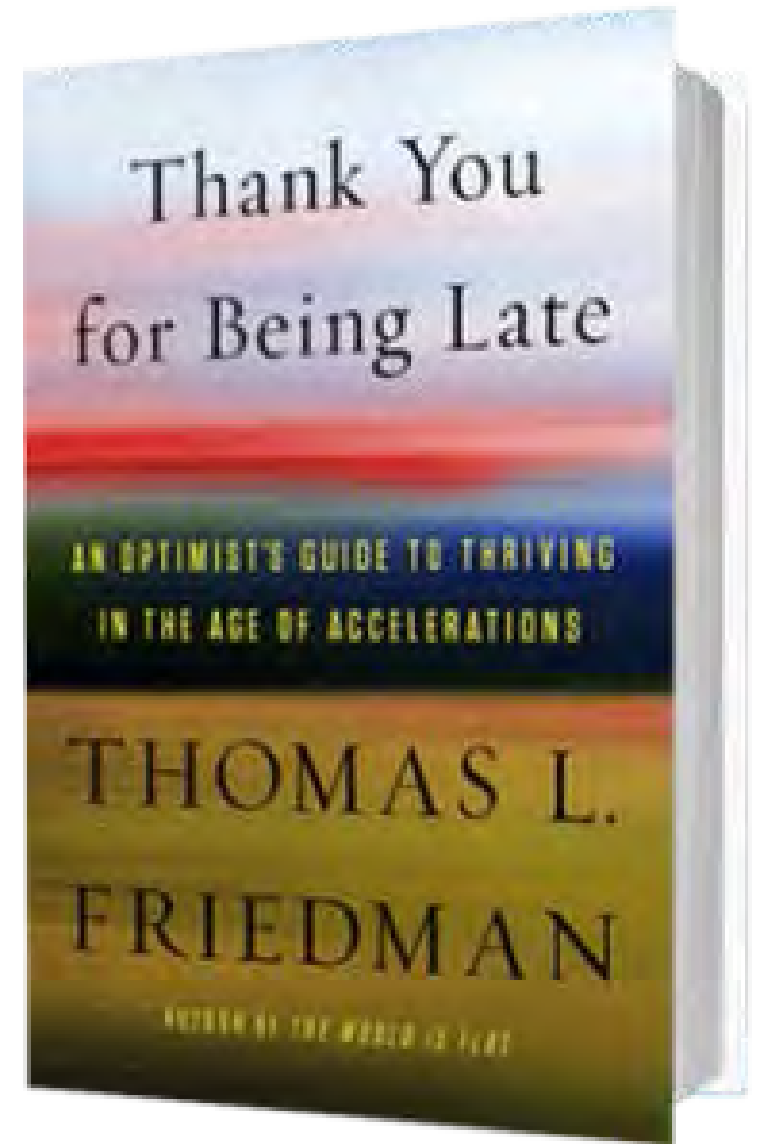
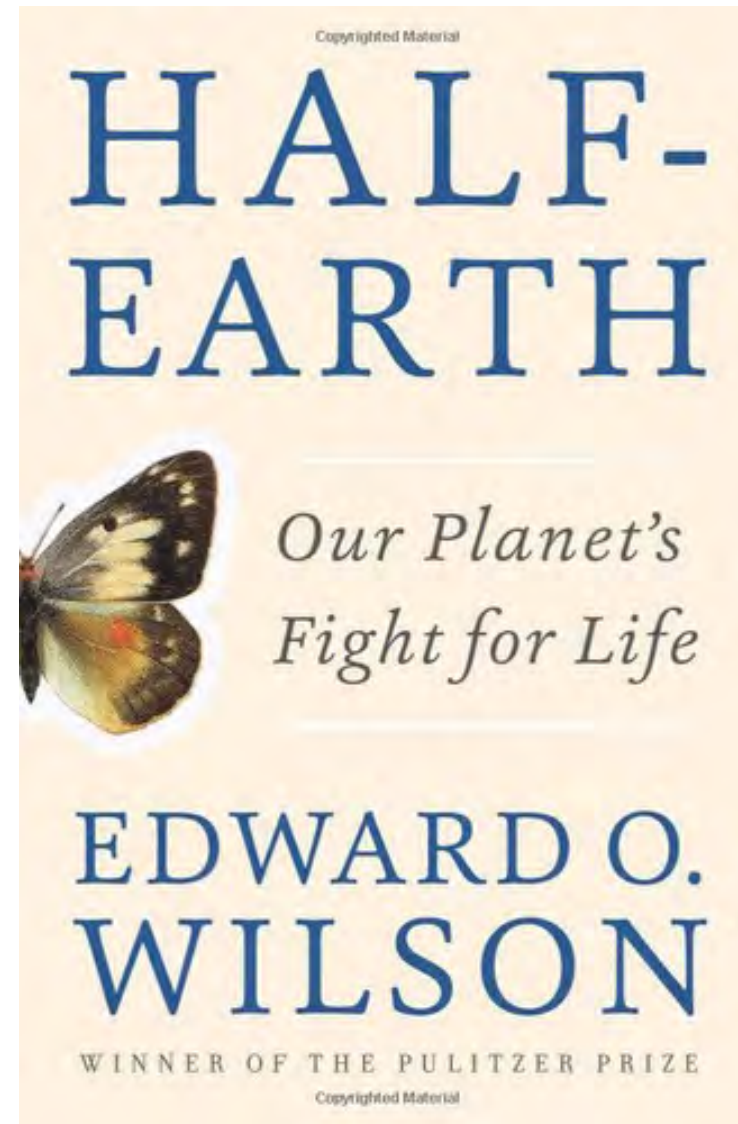
- 663,267 sq. miles
- 30% in parks
- Private land 1%
- 738,432 people

Outline



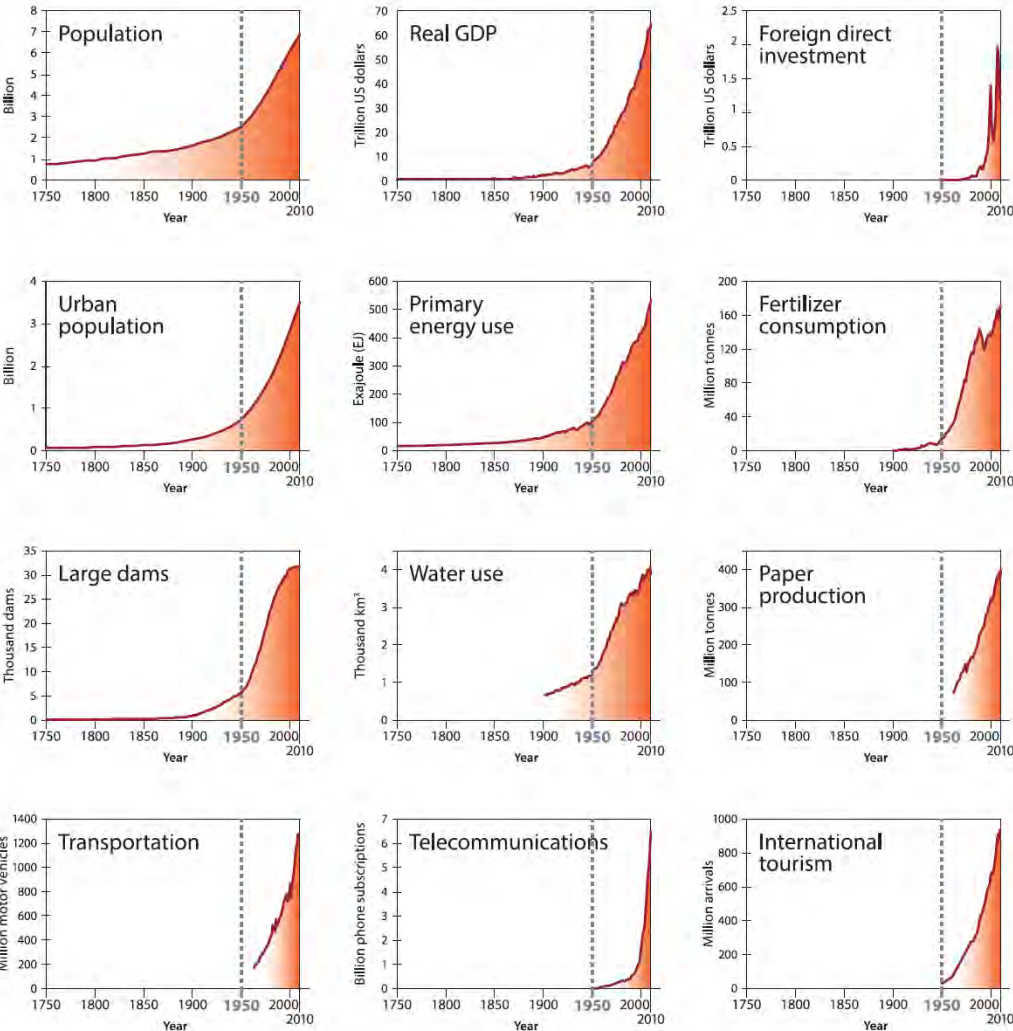
- Business as usual is not working
- Funding challenges/demands are increasing
- New partnerships and approaches needed
 - Impact Investment
 - Fish 2.0
 - Salmon Innovation Fund
 - Impact Approaches
 - State of Alaska's Salmon and People (synthesis)
 - Open Standards (adaptive management)

Recent
perspectives...

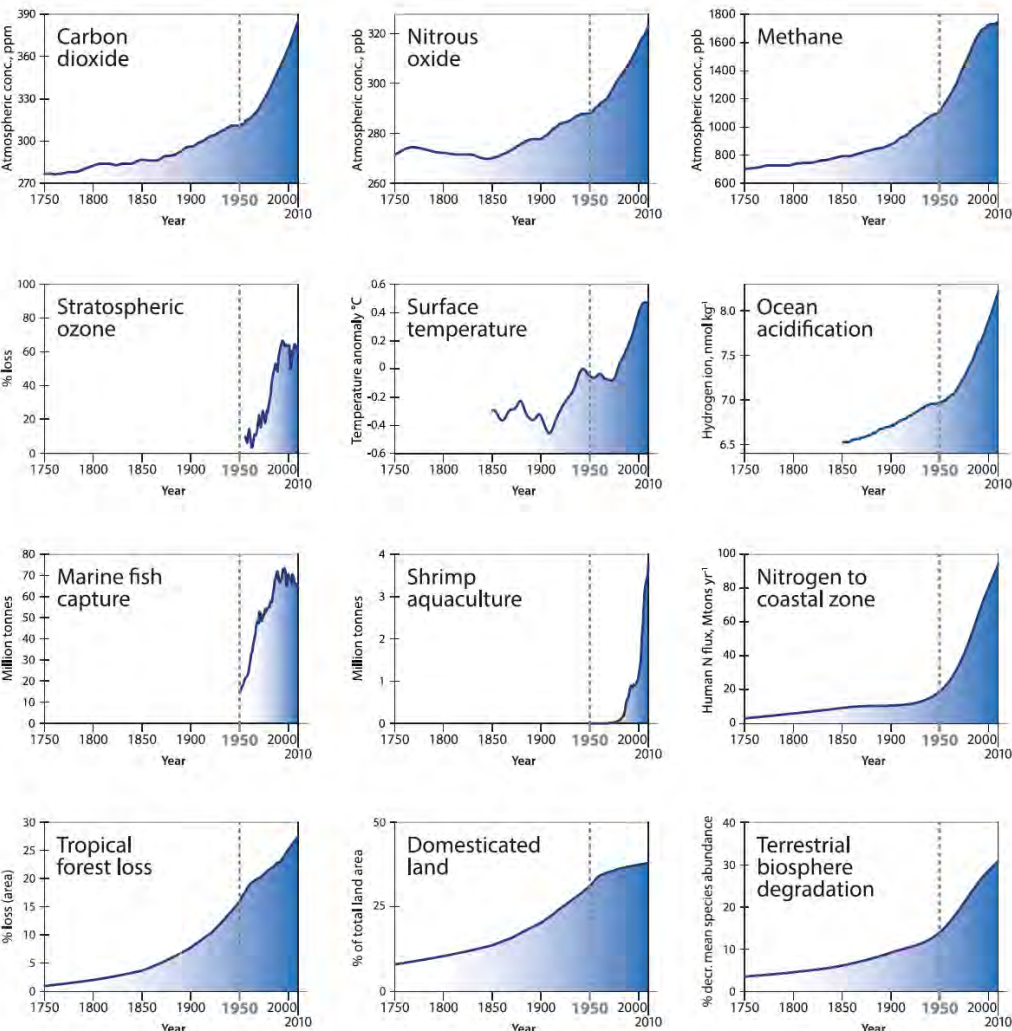


The Trajectory of the Anthropocene: the Great Acceleration

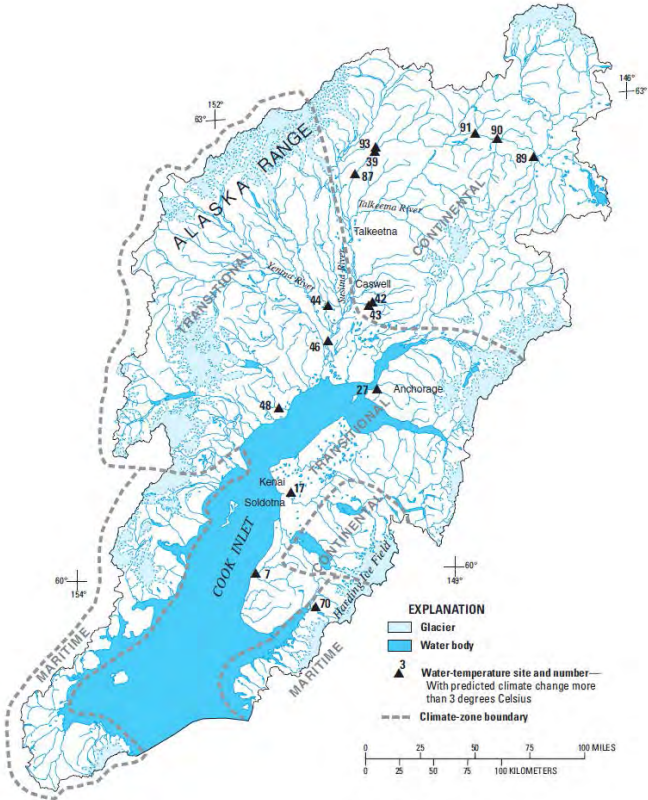
Socio-economic trends



Earth system trends



2001 Stream Temp. Concerns



<2000

What are we seeing?

- Habitat loss/changes
- >Temperature
- Glacial retreat
- > Population
- Increased competition
- etc.
- See presentations this week

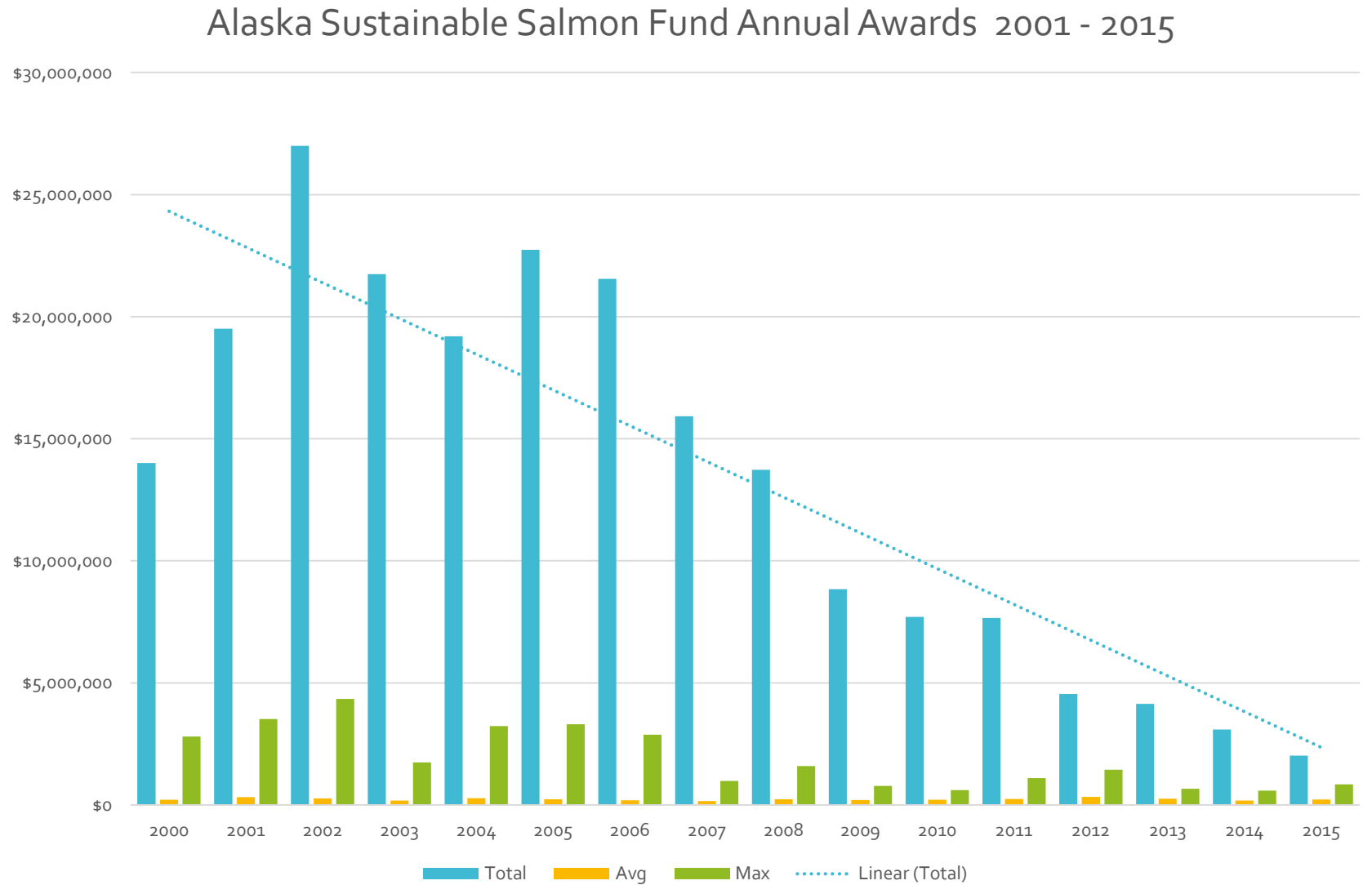
2001-20

What Might we Expect?

- Population - climate refugees (from CA, AZ)?
- Land Use – more agriculture?
- Infrastructure – new roads, bridges, dams, etc
- Less viable fish habitat
- Reduced access to fish?
- etc.

2021-2050

Salmon Funding Trends 2000-15



Schake, Dunbar and Dutton 2017: Alaska Marine Science Symposium.

AK Salmon Research and Management Funding Crisis Unfolding

Smaller Scale of Effect

NSF, NIH Programs?

Industry Supported Research?

Extra Mural Grants?



Grants for AK Nonprofits

Fish Habitat Partnerships?

Planned to End



Larger Scale of Effect

Proposed to Reduce

Increasing the Challenges of Delivering a Fish First Policy

Priority Issues and Recommendations for Alaska Fisheries:

Transition Team Committees were asked to identify the top five priority issues in their topic areas by identifying the biggest challenges they believe the State of Alaska needs to work on. Out of many ideas that were brought forward, the top five were voted on and solidified. The top five priority issues for the Fisheries Committee were:

- 1. Clear “Fish First” Policy for Alaska***
- 2. Prioritize and Improve Fishery Access for Alaskans: Develop policies, strategies, management to return fishery access opportunities to residents of Alaska’s fishing communities***
- 3. Adequate Funding for ADF&G and Fisheries Science***
- 4. Alaska fisheries should be managed based on Science over politics***
- 5. Alaska fisheries management should be locally based and adaptive***

Do we have
your
attention?



United Nations Sustainable Development Goals

2015 - 2030

\$2.5Tn annually needed
\$1.2 Tn currently



<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

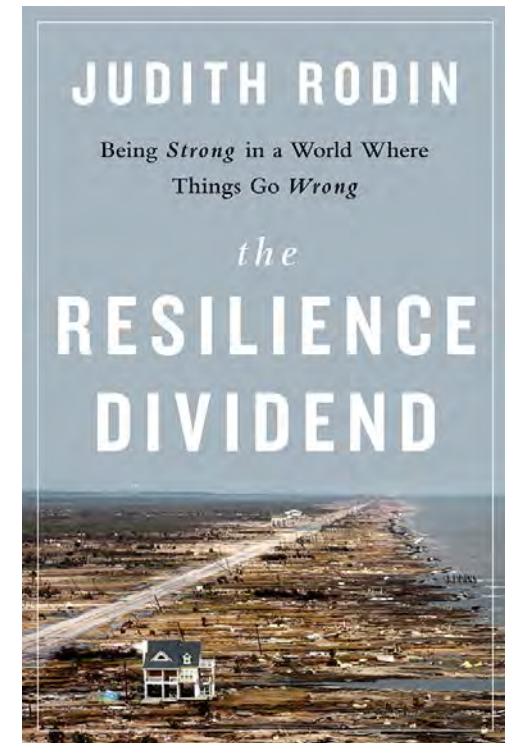
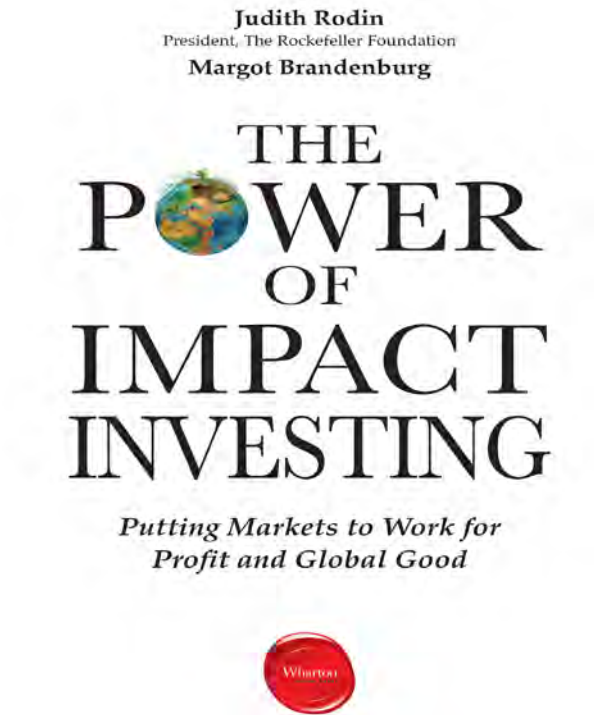
What do all these ventures have in common?



- Storyfield Farms (organic yogurt)
- Zipcar (environmentally friendly car-sharing)
- Honest Tea (responsible supply chain for iced tea)
- RecycleBank (curb-side recycling meets couponing)
- Grameen Bank (microfinance pioneer)
- Iriquois Valley Farms (young farmer land access)
- Husk Power Systems (rural electrification)
- A to Z Textile Mills (anti-malarial bednets)
- Goldman Sachs Social Impact Bonds (early childhood education)
- Liberty and Justice (women-owned manufacturing)
- Catalyst AgTech (reducing agrochemical products)
- LifeSpring (low-cost maternity hospitals)
- Karenegera Coffee - KZ Noir
- Farmland LP (organic agriculture)

Rockefeller Foundation: Impact Investing Field Builder

- 2008 Rockefeller Foundation Board approved \$38M Impact Investing Initiative – subsequently expanded.





<https://thegiin.org/>

What is Impact Investing?

- Investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return.





Who Makes Impact Investments?

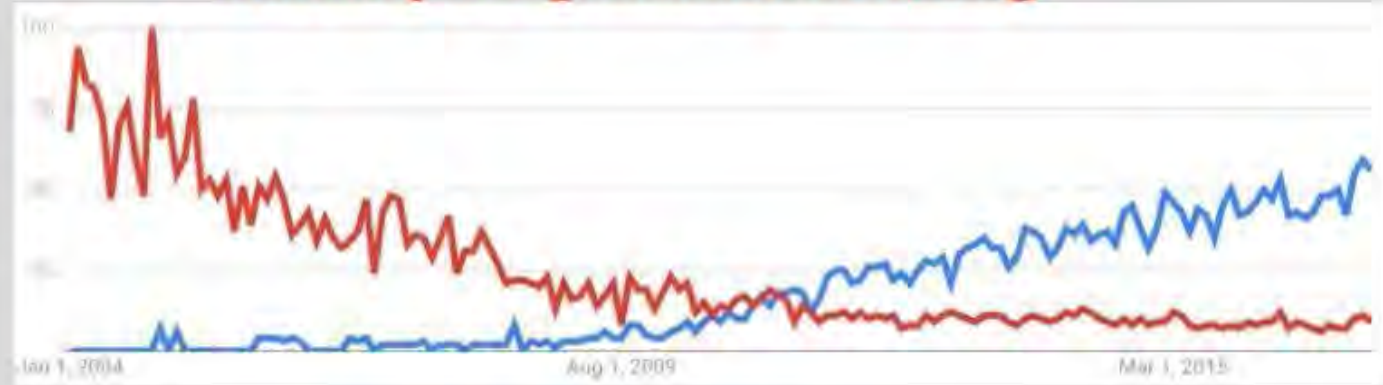
- Diversified financial institutions
- Pension funds
- **Private foundations** (making program and/or mission-related investments)
- Insurance companies
- Development finance institutions
- Specialized financial institutions
- Large-scale family offices
- Fund managers
- **Individual investors**



<http://neveralonegame.com>

SRI vs Impact Investing

Socially Responsible Investing



2004

Impact Investing

2017

Google Search Trend Data:

Interest in "impact investing" has outpaced interest in "Socially Responsible Investing" because social enterprises can change the world in wonderful ways. If they succeed more in collaboration then systemic change is possible.



New Global Group- Impact investors who care about systemic change:

group:<https://www.linkedin.com/groups/13520549>



Bay Area Impact Investing For Systemic Change Group:

<https://www.meetup.com/Whole-Outcome-Investors-Impact-Investing-For-Systemic-Change/>





What is current scale and potential?

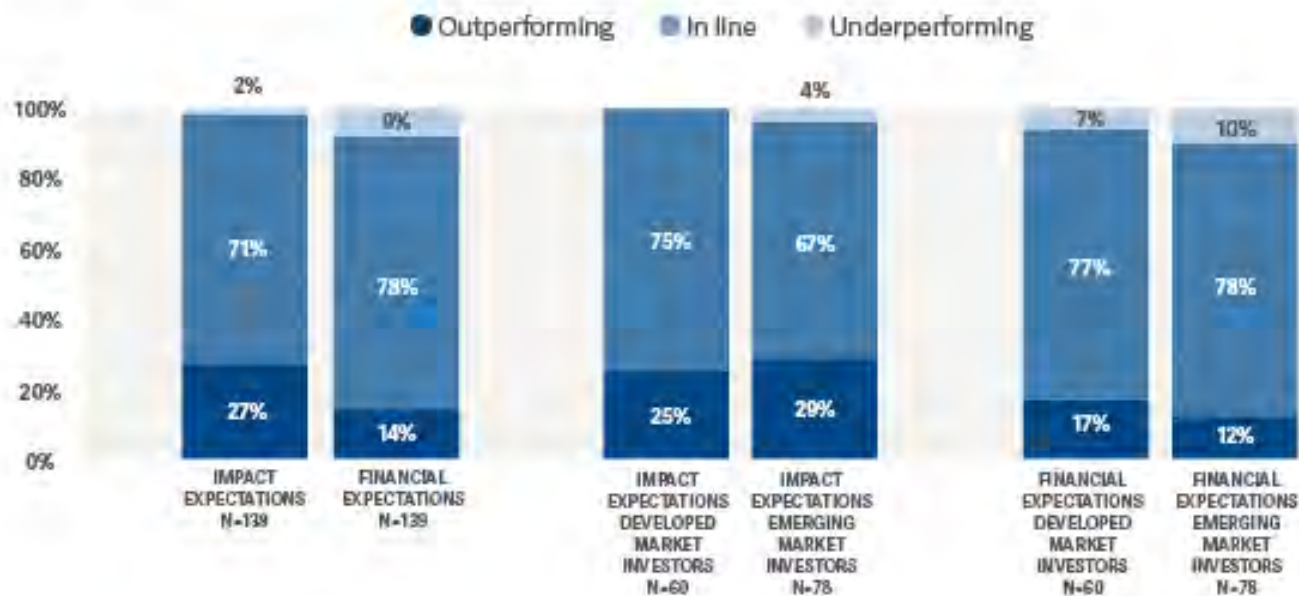
- \$80 Bn invested via impact investment funds globally in 2016 (\$15Bn new in 2015)
- Major Foci of Impact Funds:
 - Housing (27%)
 - Energy (10%)
 - Healthcare (5%)
 - Food and Agriculture/Fisheries (5%)



How Are Impact Investments Performing?

RESPONDENTS' PORTFOLIO PERFORMANCE RELATIVE TO THEIR EXPECTATIONS

Number of respondents is shown under each category; some respondents chose "not sure" and their responses are not considered here.





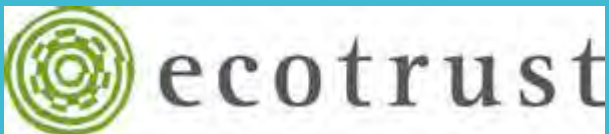
Challenges

CHALLENGES TO THE GROWTH OF THE IMPACT INVESTING INDUSTRY TODAY (N=146; RESPONDENTS RANKED TOP THREE)

RANK SCORE

1	193	Lack of appropriate capital across the risk/return spectrum
2	174	Shortage of high quality investment opportunities with track record
3	115	Difficulty exiting investments
4	97	Lack of common way to talk about impact investing
5	87	Lack of innovative deal/fund structures to accommodate investors' or portfolio companies' needs
6	76	Lack of research and data on products and performance
7	67	Inadequate impact measurement practice
8	57	Lack of investment professionals with relevant skill sets

Source note: GIIN, J.P. Morgan, "Eyes on the Horizon," 2015.



Case Study:

Sustainable Forestry Funds

- Began 2004 in OR & WA with initial \$30M fund to acquire 13,000 acres
- Stacked Funding Mix:
 - Packard Foundation invested \$10M 7.5 year @1%
 - Meyer Memorial Trust – first ever impact investment
 - Russell Foundation divestment
 - OR Govt \$2.5M
- Target IRR = 6%
- Financial Returns
 - Carbon Credits
 - Timber Sales
 - Ecological Services
 - Tax Credits (new markets)



Social and Environmental impacts

- ↑ Carbon sequestration
- ↑ Species diversity
- ↑ Water quality, accessibility & distribution
- Space for non-motorized recreation
- Job creation in low income communities

Impact Investing potential in land and water conservation?

Nature Vest Survey (2009-2013)

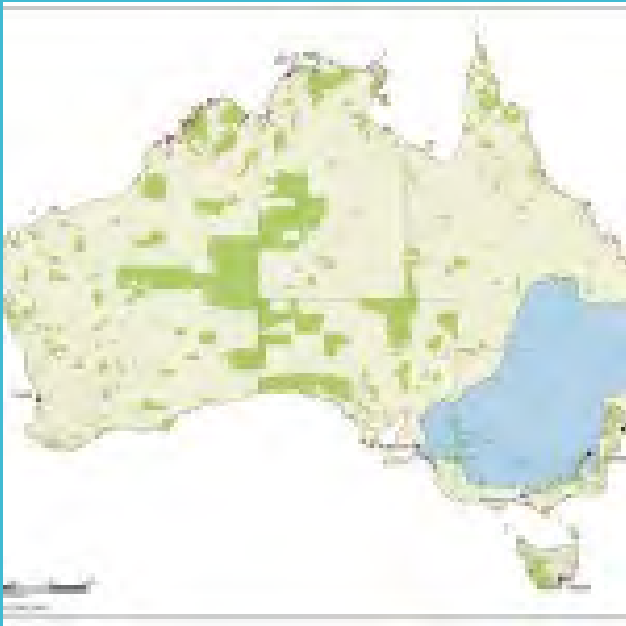
- \$23 billion to conservation impact investments over 5 yrs
- Expected to triple in next 5 yrs (2014-2018)



- Water quantity and quality conservation
- Sustainable food and fiber production
- Habitat conservation

Greater ecological impact improves the financial results →
Markets monetize the impact and expand...

Case Study: Australian Balanced Water Fund



- Murray Darling Basin provides 30% of Australia's food
- 80% of Basin ecosystems are in poor health
- Many issues with diversions and climate change
- Opportunity to invest in permanent water rights for nature and wetlands, including cultural sites
- Currently \$20M – planned to go to \$100M by 2020



Case Study:

Swapping Debt for Climate Change Adaptation and Marine Conservation

Seychelles, western Indian Ocean

- \$21.6 million debt-swap
- Mix of impact investments and grants



Results

- Generates a sustainable & permanent endowment for conservation & climate adaptation
- 2nd largest marine reserve in Indian Ocean
- Fuel Tourism & Tuna sectors of economy
- Seychelles' Conservation & Climate Adaptation Trust (SeyCCAT)
- Capitalized at \$10 million after 20 yrs
- \$600,000 annual pay out to fund climate adaptation & conservation

<http://www.nature.org/ourinitiatives/regions/africa/wherewework/seychelles.xml>



Clean & Green Tech Companies

- Khosla Ventures, Silicon Valley investor in **Solum**
 - Started by Stanford physics grads
 - Tools to measure soil nutrient content
 - Allows precise application of fertilizer
 - Keeps waterways healthy by decreasing nitrogen runoff



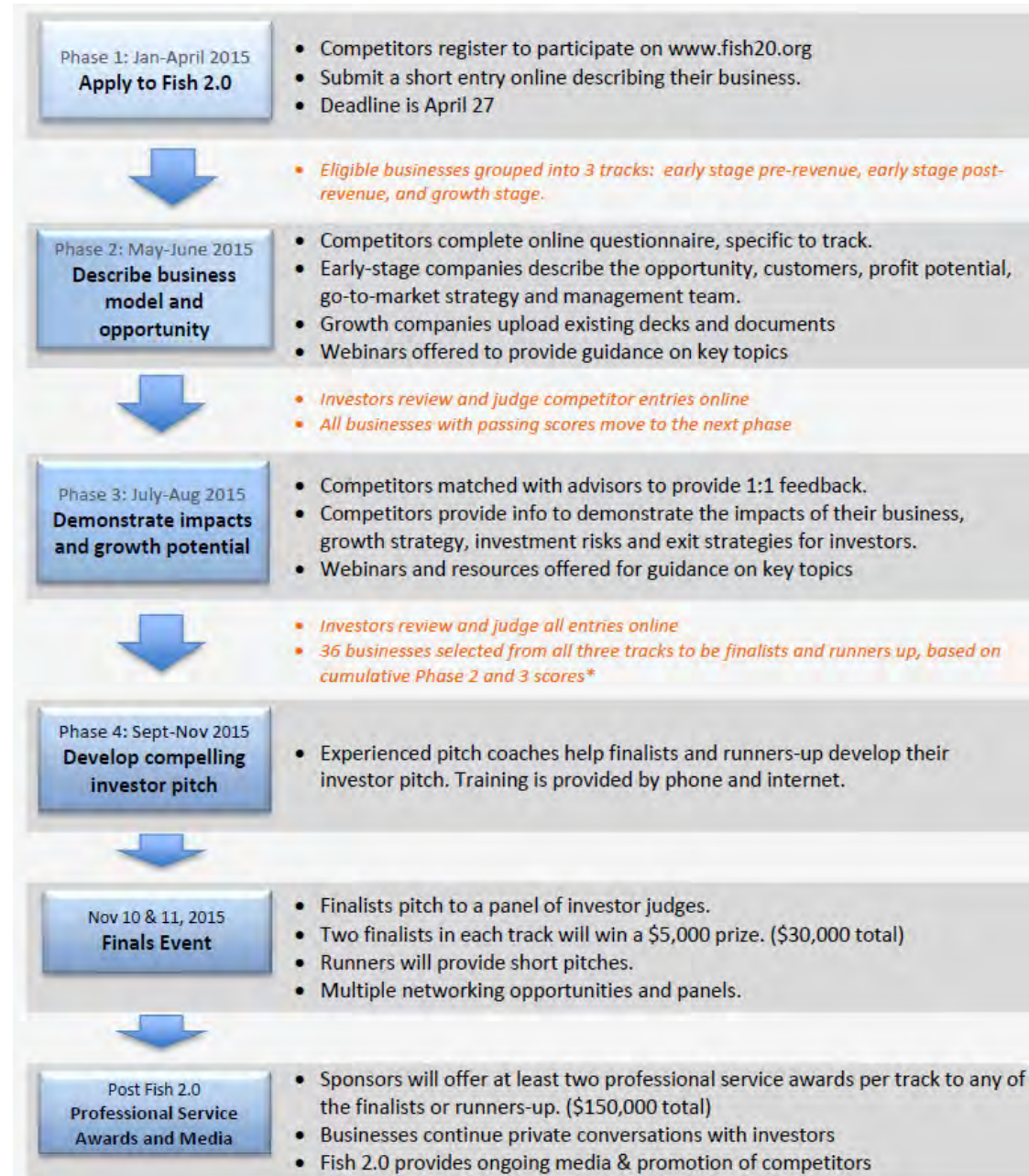
<http://solum.ag/>



<http://www.fish20.org/>

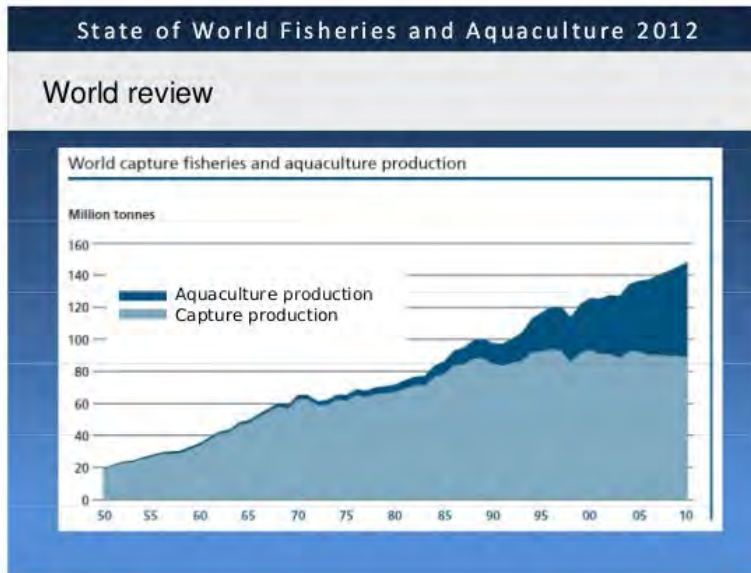
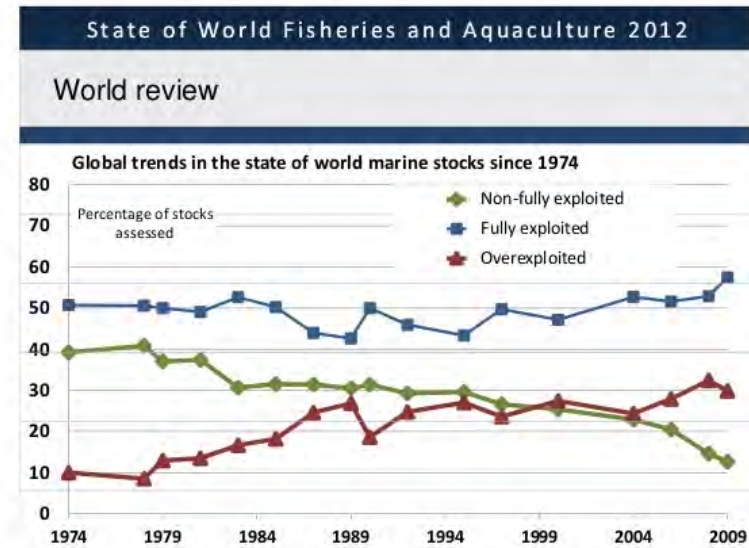
Competitions to Spur Impact Innovation:

Fish 2.0 Process



**Deadline
to
register
April 29
2017**

Fish 2.0 Context



- **Current global fisheries management regimes not working:**
 - inadequate market incentives to support sustainable wild fisheries
 - Inadequate mechanisms to expand sustainable aquaculture
- **How to incentivize change in the way we produce fish?**
 - Profitable
 - Enhance beneficial social impacts
 - Reduce negative environmental impacts

Fish 2.0 2015 Winners



- **TRACK A - Pre-Revenue Business - Winners:**
 - Kampachi Farms Mexico - Strongest Market Potential
 - The RiverBox, by SabrTech, Canada - Greatest potential for social and environmental impact
- **TRACK B - Early Stage Businesses- Winners:**
 - Salty Girl Seafood, USA - Strongest Market Potential
 - Bureo, Chile and USA - Greatest potential for social and environmental impact
- **TRACK C - Growth Stage Businesses - Winners**
 - *Alaska Community Seafood Hub, USA - Greatest potential for social and environmental impact*
 - ALFA Fishing. Vanuatu - Greatest potential for social and environmental impact





Salmon Innovation Fund

<http://salmonfund.com>

Our Solution



**Arming
Conservation
Using
Risk Capital**

Genomics
Robotics
Textiles
Tracking
Sonar
Hydropower
Textiles
Marketplaces

Stormwater
100% Use
Drones
Artificial Intelligence
RFID
Machine Learning

Innovation



Investment Structure



DroneSeed

Drone-based Reforestation

Portland, OR

<http://www.droneSeed.co>

- Automated drone-based reforestation technology
- 5-10x faster at 1/10th cost, plus remote access
- Enables faster reforestation of hillsides



Early Stage Investment

Broad App

Drone based seeding across agricultural spectrum

Financing

Seed stage, raising capital later in 2016

Status

First unit built, testing with large forestry company

Likely Exit

Sale to precision forestry services company

Salmon & Steelhead Management

Problem

Logging creates massive erosion issues, delays in reforestation

Application

Drone-based reforestation system

Impact

Enables "Rapid Response" and greater scale of reforestation



Investment Opportunity Example

State of Alaska's Salmon and People Synthesis (SASAP)

Complement to impact investments



NCEAS

www.nceas.ucsb.edu



- NSF Center 1995-2010
- UCSB Research Unit 2014
- >500 synthesis projects NSF
- *Long Term Ecological Research Network Communication Office*
- *NSF Arctic Data Center*
- *Science for Nature and People Partnership (SNAPP)*
- *Gulf of Alaska Synthesis*



Courtesy: LTER Network Office

State of Alaska's Salmon and People Synthesis



GBMF Funds SASAP

NCEAS & NII (Co-PIs)
January 2016



Round 1 Scoping & Nominations



1. Governance
2. Biophysical
3. Sociocultural & Econ



Round 2 Call for Proposals

Pressures & Responses to Salmon
July 2016



Round 2 Workgroups Awarded Oct 2016

1. Wellbeing & Salmon Systems
2. Kenai Lowlands
3. Enabling Community Modeling
4. Salmon Size Declines
5. Ocean Climate Interactions



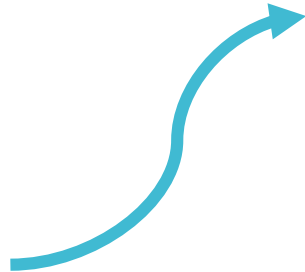
GBMF funds Data Task Force

NCEAS & NII (Co-PIs)
October 2016



Data, Data, Data

Acquire, Clean, Archive



Synthesis!



Workgroups meet
@ NCEAS
& in Alaska



Synthesis Findings

March 2018



Stakeholder Engagement

- Salmon & Society Nov 2016 Workshop
- Promote SASAP at conferences & solicit feedback



Stakeholder Engagement

Communications workshop autumn
2017: data needs & delivery tactics



Communication Outreach

Widely distribute findings to public
Summer 2018

State of Alaska's Salmon and People (SASAP)

SASAP

Co PI: Frank Davis
(NCEAS)

Co PI: Ian Dutton (NII)

Round 1

PI: Peter
Westley

Governance

Lead: Steve Langdon

CoLead: James Fall

CoLead: Taylor Brelsford

Members: Megan Krupa,

Nicole Kimball, Wilson

Justin, Mike Williams,

Molly McCarthy

Sociocultural & Economics

Lead: Courtney Carothers

CoLead: Toby Schworer

CoLead: Jessica Black

Advisors: Julie Raymond-
Yakoubian, Caroline Brown,
Ben Stevens, Rachel
Donkersloot, Gunnar Knapp,
Liza Mack, Rob Sanderson Jr,
Alex Whiting

Biophysical

Lead: Peter Westley

CoLead: Dan Rinella

Members: Stephanie Quinn-
Davidson, Madeline
Jovanovich, Rebecca Shaftel

Advisors: Matt Sloat, Rich
Brenner

Round 2

5 Working
Groups

Well-Being and Alaska Salmon Systems

PI: Rachel Donkersloot

Using participatory modeling to empower community engagement in salmon science

PI: Michael Jones

Consistency, causes, and consequences of declining size and age of Alaskan salmon

PI: Eric Palkovacs

Interacting effects of ocean climate and at- sea competition on Alaskan salmon

PI: Peter S. Rand

Kenai Lowlands Salmon Research Synthesis and Design of Tools for Integrated Watershed Management

PI: Coowe Moss Walker

NCEAS Support

SASAP Co-PI: Frank Davis (Santa Barbara)

Post Doc: Jorge Cornejo (Santa Barbara)

Director of Computing: Mark Schildhauer (Santa Barbara)

Director of Informatics Research & Dev: Matt Jones (Juneau)

Scientific Programmer: Julien Brun (Santa Barbara)

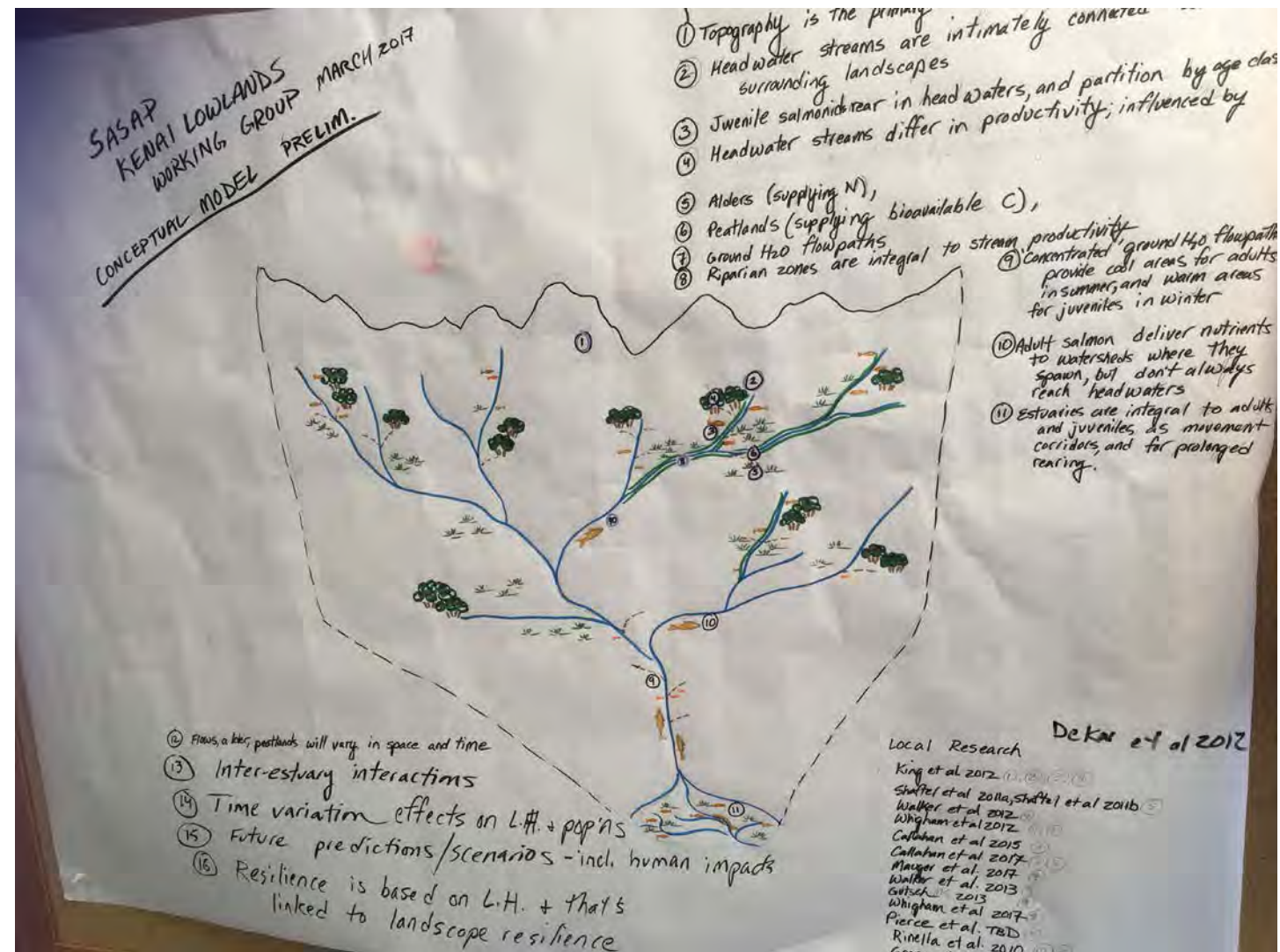
Project Data Coordinator: Jeanette Clark (Santa Barbara)

Nautilus Impact Investing (NII)

SASAP Co-PI: Ian Dutton (Anchorage)

Coordinator & Data Support: Katherine
Schake (Anchorage)

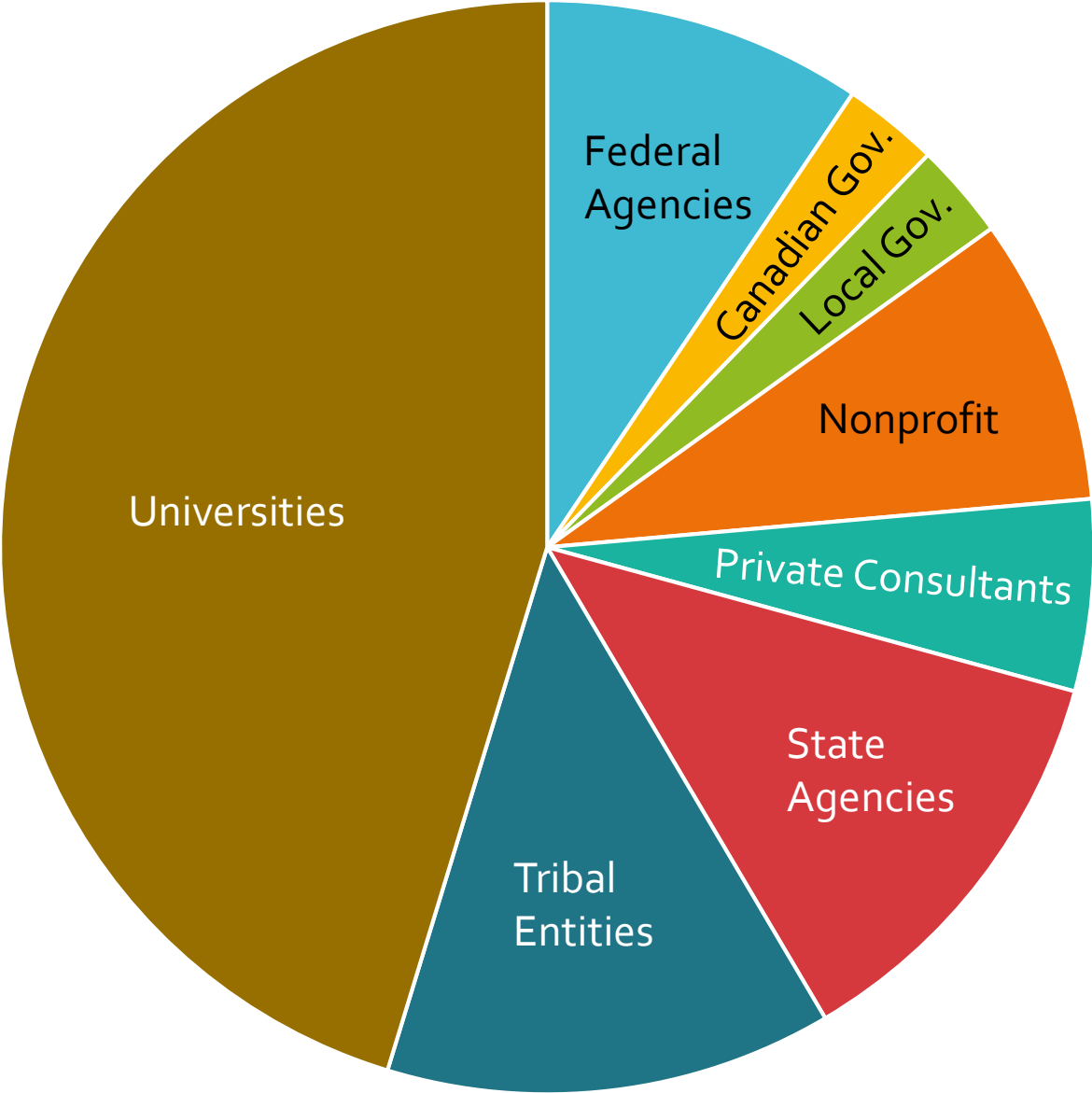
Initial Framing: Kenai Lowlands Group



SASAP

Organizations/ Affiliations

Eight Working Groups
106 Total Participants



Salmon Data Task Force

Co PI: Matt Jones (NCEAS)

Co PI: Ian Dutton (NII)

NCEAS Support Staff

Matt Jones, Director of Informatics and R&D *(Juneau)*

Responsible for deliverables. Driving the Data Task Force project; providing technical training and guidance on tools to assist Working Groups in managing, tracking, and archiving data.

Mark Schildhauer, Director of Computing *(Santa Barbara)*

Drives how NCEAS infrastructure is used and assists Working Groups in utilizing infrastructure. Fosters a culture of sharing knowledge (codes, data formats, etc) that have been useful to other WGs.

Julien Brun, Scientific Programmer *(Santa Barbara)*

Assists Working Groups in the use of NCEAS analytical & collaborative tools and infrastructure.

Jeanette Clark, Project Data Coordinator *(Santa Barbara)*

Jesse Goldstein, Project Data Coordinator *(Santa Barbara)*

Jorge Cornejo, SASAP Post Doc *(Santa Barbara)*

Graduate student interns

~6 FTE trained by the Projects Data Coordinator and responsible for GitHub ticketing, tracking down data, metadata cleaning, etc.

Scientific Programmer 50% SASAP, 50% DTF; probably new hire, or combo of Julien and a new hire

Software developer Part time, to help develop the salmon data portal as a part of the KNB

Ethnography Study *University of Washington*

David Ribes

Associate Professor, Human Centered Design & Engineering

Sarah Inman

PhD Student, Human Centered Design & Engineering

Charles Hahn

PhD Student, Human Centered Design & Engineering

Subcontracts to Management Agencies

AK Dept of Fish & Game (ADFG)

US Fish & Wildlife Service (USFWS)

NOAA National Marine Fisheries Service (NMFS)

Nautilus Impact Investing

Ian Dutton, SASAP & Data Task Force Co PI *(Anchorage)*

Responsible for deliverables.

Katherine Schake, Coordinator *(Anchorage)*

Overall coordination between all SASAP working groups and data task force; assists working groups with data needs

What Might
SASAP
deliver?



2014

State of Salmon
in Watersheds
Executive Summary



WASHINGTON STATE
RECREATION AND CONSERVATION OFFICE
Governor's Salmon
Recovery Office



SASAP NEEDS YOU!

We're seeking public input as we synthesize a wealth of science and traditional knowledge about Alaska salmon, and we want to know:

How can this comprehensive data base benefit YOUR salmon-centered work and life?

VISIT our poster during the Poster Session

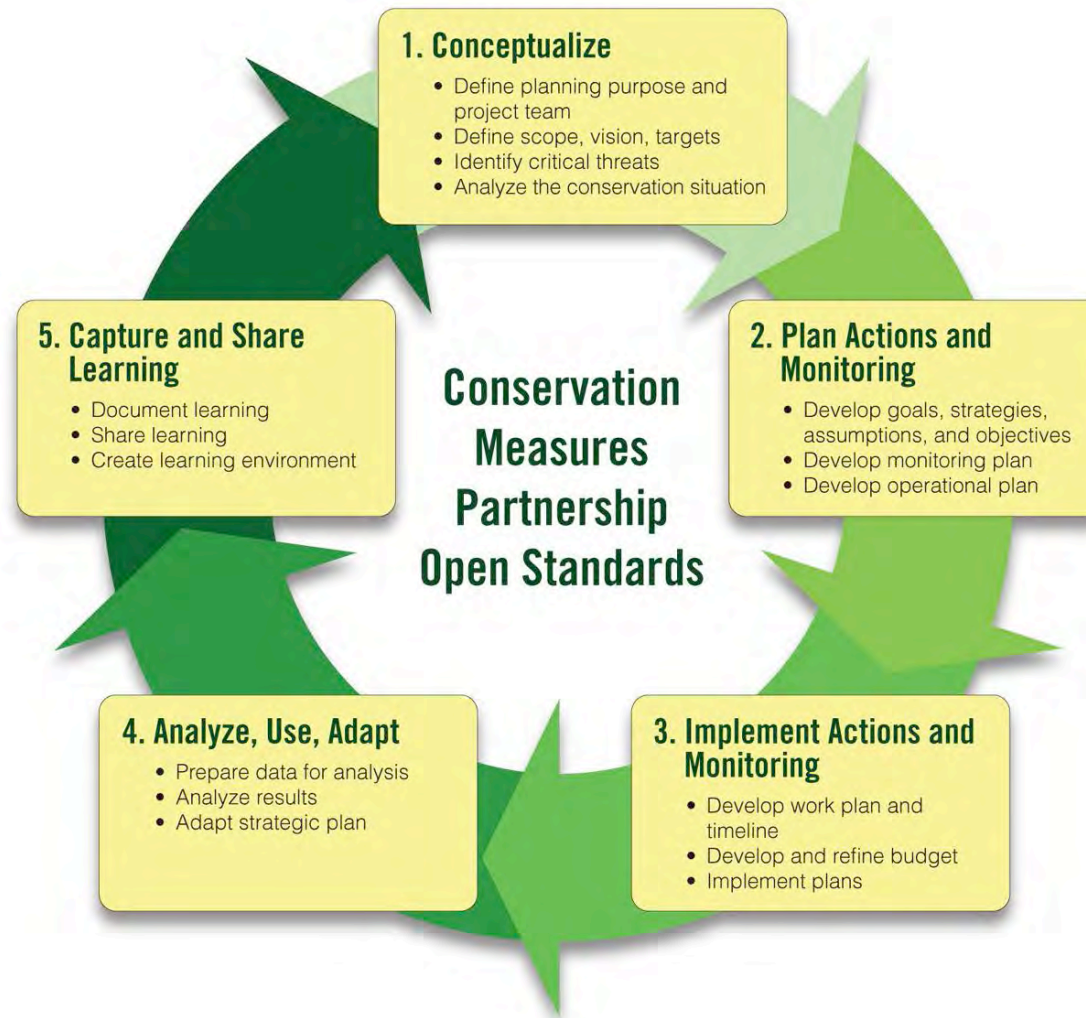
EMAIL your thoughts & ideas: SASAP-input@nceas.ucsb.edu

VISIT our website: alaskasalmonandpeople.org



Open Standards Adaptive Management Framework

transparent
collaborative
measures-based



Great framework for designing and tracking impact investments

KPFHP Freshwater CAP 2014

Potential Threats Across Targets		Steep coastal streams	Non-glacial mountain rivers	Glacial rivers w/o lakes	Glacial rivers w/ lakes	Lowland groundwater/wetland-dominated systems	Closed-basin lakes	Clearwater connected lakes with associated streams	Overall Threat Rank
Project-specific threats		1	2	3	4	5	6	7	
1	Injurious aquatic invasive species				Low	High	High	High	High
2	Warmer climate		Medium		Low	Medium	Medium	Medium	Medium
3	Incompatible road development		Low	Medium	Low	Medium		Low	Medium
4	Residential development in riparian zone				Medium	Medium			Medium
5	Hydro development	Low	Medium	Low	Low			Low	Low
6	Incompatible mining	Low	Low			Medium			Low
7	Catastrophic spill (vehicle, tank farm, pipeline)				Low	Medium			Low
8	Urbanization/development outside the riparian zone				Low	Medium			Low
9	Incompatible ORV use					Medium			Low
Threat Status for Targets and Project		Low	Medium	Low	Medium	High	Medium	Medium	Medium

Towards Greater Returns

\$ + Fish

- Mindset - think like an investor, focus on ROI
- Access Impact Investing (and related) resources
- Partner differently
- Engage entrepreneurs and impact-oriented funders
- Leverage public-private partnerships (e.g. AK innovation caucus)
- Emphasize adaptive management strategies
- Be transparent
- Share data and lessons, even “failures”
- Communicate with purpose and enthusiasm
- Crowdsource (not all impact investing has to be big \$)

Thank You
Questions?



Impact Investing Resources

To learn more contact:

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(907) 280-8923
ian@nautilusii.com
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Katherine Schake
(907) 205-0235
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- Global Impact Investors Network - <https://thegiin.org>
- GIIN Metrics Database (IRIS) - <https://iris.thegiin.org/metrics>
- GIIN Cambridge Benchmark study - https://thegiin.org/assets/documents/pub/Introducing_the_Impact_Investing_Benchmark.pdf
- GIIN Deal Database - <http://www.impactbase.org>
- Rockefeller Foundation - <https://www.rockefellerfoundation.org/our-work/initiatives/innovative-finance/>
- Case Foundation - <http://casefoundation.org/program/impact-investing>
- Got \$20? You can be an impact investor. http://www.csmonitor.com/Business/new-economy/2016/0218/Got-20-You-can-be-an-impact-investor?cmpid=gigya-tw&utm_content=buffer1e7e2&utm_medium=social&utm_source=plus.google.com&utm_campaign=buffer
- Mission Investors (private foundations) - <https://www.missioninvestors.org>
- ImpactAlpha – <http://impactalpha.com/category/impact-investing>
- JP Morgan Chase – https://www.jpmorganchase.com/corporate/socialfinance/document/impact_investments_nov_2010.pdf
- Calvert Foundation's community investment note – a vehicle for “crowd funding” through partnerships with community development organizations – see <https://www.vested.org>
- Case Foundation - <http://casefoundation.org/program/impact-investing> ; Social Impact Bonds blog <http://casefoundation.org/blog/social-impact-bonds-investing-in-public-private-partnerships/>
- Credit Suisse - <https://www.credit-suisse.com/media/assets/corporate/docs/about-us/responsibility/banking/conservation-finance-en.pdf>
- MaxImpact – agriculture and agribusiness deals – <http://maximpactblog.com/cultivating-change-why-agriculture-needs-impact-investing>
- Stanford Social Innovation Review (SSIR) - http://ssir.org/topics/category/impact_investing
- Omidyar Network - <https://www.omidyar.com>

More Focused Impact Deal Resources

To learn more contact:

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Katherine Schake
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www.nautilusii.com

- Local AK Opportunity - <http://www.akacceleratorfund.com/about>
- Ag 2.0 <http://blog.motionry.com/blog/2014/8/7/beyond-silicon-valley-agtech-across-the-globe>
- Fish 2.0 - <http://www.fish2o.org>
- The Carrot Project - <http://www.thecarrotproject.org>
- Spring Creek Foundation - <http://www.springcreekfoundation.org/>; COHIF: <http://www.cohif.org/Greater-Four-Corners-Pilot-Project/how-the-gfc-pilot-work>
- Khosla Ventures - <http://www.khoslaventures.com/portfolio/all-companies>
- Encourage Capital - <http://encouragecapital.com/solutions-strategies/sustainable-seafood> & <http://investinvibrantocéans.org>
- Statewide Impact Investing approach - <https://www.missioninvestors.org/events/colorado-impact-day>
- Ecosystem Marketplace http://www.ecosystemmarketplace.com/wp-content/uploads/2015/09/the_matrix.pdf
- Nature Vest & TNC - <http://www.naturevesttnc.org/reports/>; Davos Blog: <http://blog.nature.org/conservancy/2016/01/19/six-ways-impact-investing-is-transforming-the-environmental-movement/?post=47867#sthash.QUCqmobx.dpuf> - Mark Tercek
- **WWF** – evaluation of forest certification - http://d2ouvy59podg6k.cloudfront.net/downloads/profitability_and_sustainability_in_responsible_forestry_executive_summary_final_1.pdf