Program Design

Carrie Sanneman & Sam Baraso

WILLAMETTE PARTNERSHIP

4640 SW Macadam Ave., Suite 50, Portland, OR 97239 | T: 503.946.8350 | F: 971.229.1968 | W: www.willamettepartnership.org

LAYING THE GROUNDWORK FOR MORE EFFECTIVE CONSERVATION.

What are Ecosystem Services?

What are Ecosystem Services?

Types of Ecosystem Services

	Forests	Oceans	Cultivated / Agricultural Lands
Environmental Goods	• Food • Fresh water • Fuel • Fiber	• Food	• Food • Fuel • Fiber
Regulating Services	• Climate regulation • Flood regulation • Disease regulation • Water purification	• Climate regulation • Disease regulation	• Climate regulation • Water purification
Supporting Services	• Nutrient cycling • Soil formation	• Nutrient cycling • Primary production	• Nutrient cycling • Soil formation
Cultural Services	• Aesthetic • Spiritual • Educational • Recreational	• Aesthetic • Spiritual • Educational • Recreational	• Aesthetic • Educational

Source: Millennium Ecosystem Assessment 2005 (http://www.millenniumassessment.org)

What are Ecosystem Service Markets?

Payment for Ecosystem Service?

- Voluntary
- Well-defined ecosystem service
- Someone paying (buyer)
- Someone providing (seller)
- Over an agreed upon amount of time

Types of Programs

- Public payment for private landowners
  - Farm Bill
- Voluntary markets
  - Climate Action Reserve, VCS
- Regulatory markets
  - Conservation banking, WQT
- Self-organized private deals
  - Perrier

(Forest Trends, 2008)

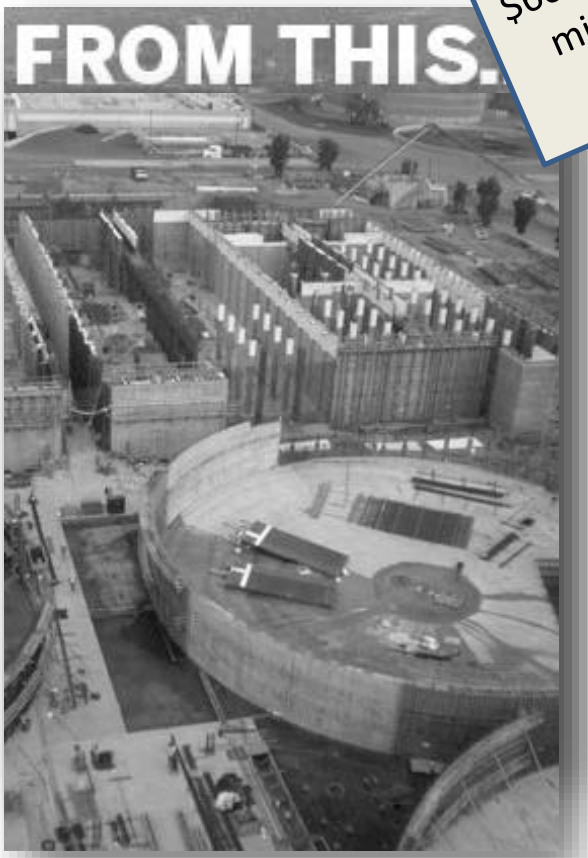
Tualatin River, Oregon

Tualatin River, Oregon

Restoration for compliance, converting…

Cooling Towers

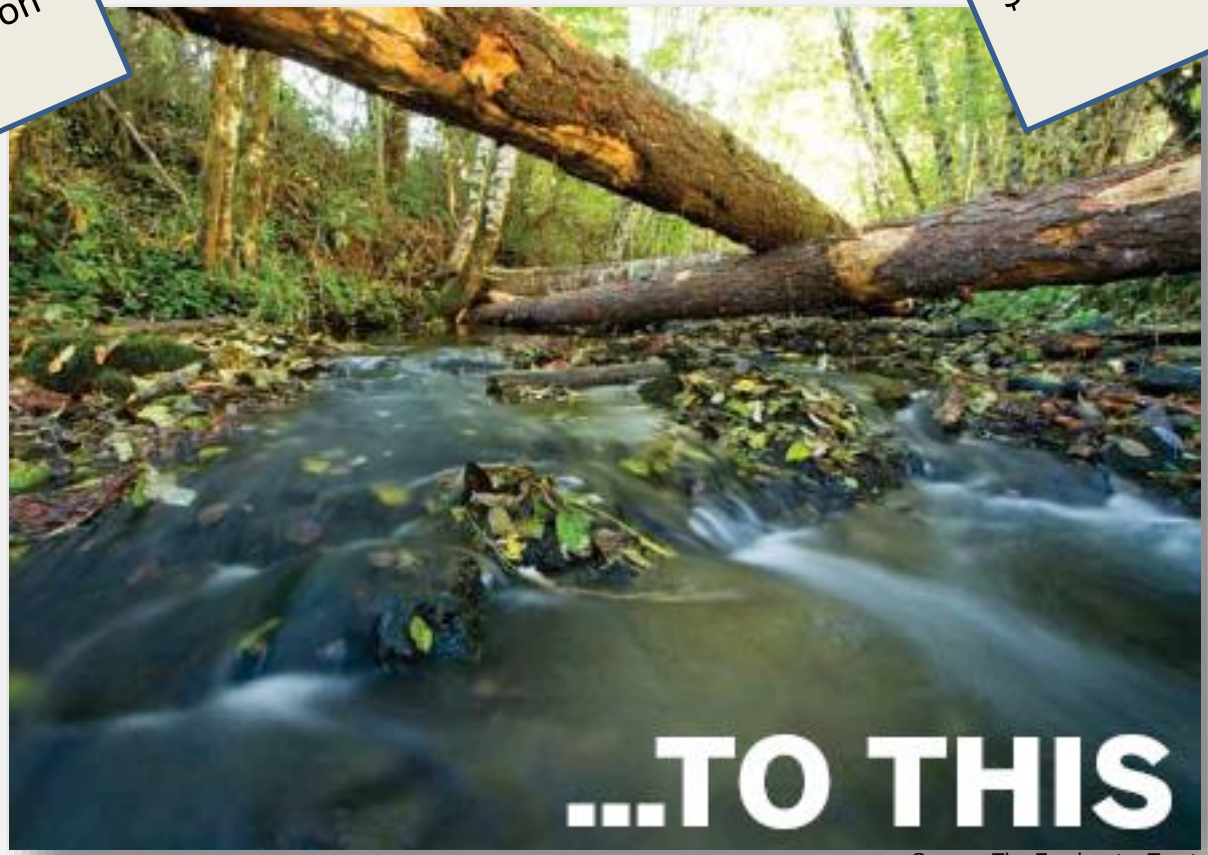
$60 - $150 million



35 miles of restoration

Additional instream flow

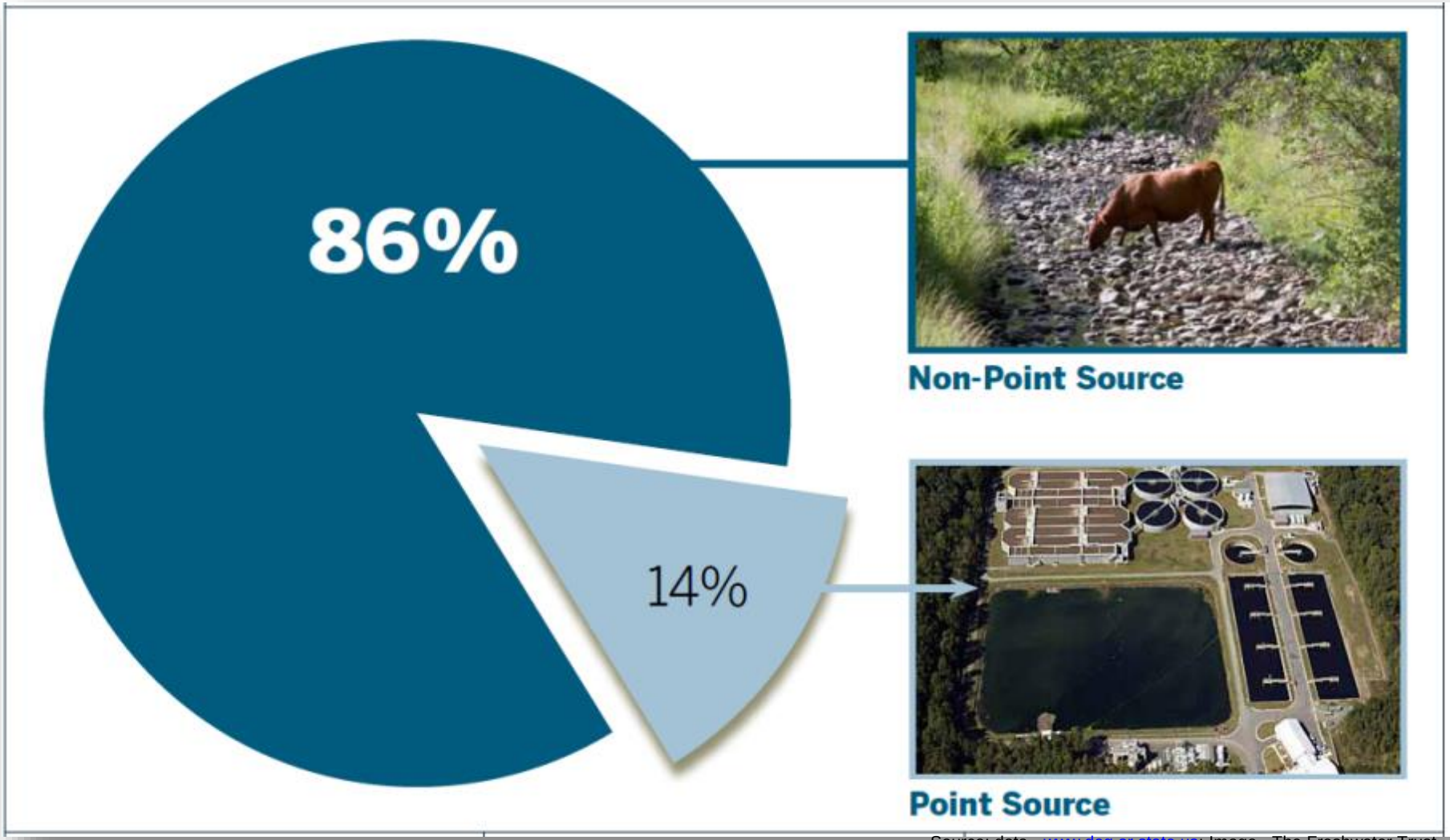
$6 million



Source: The Freshwater Trust

Restoration for Compliance

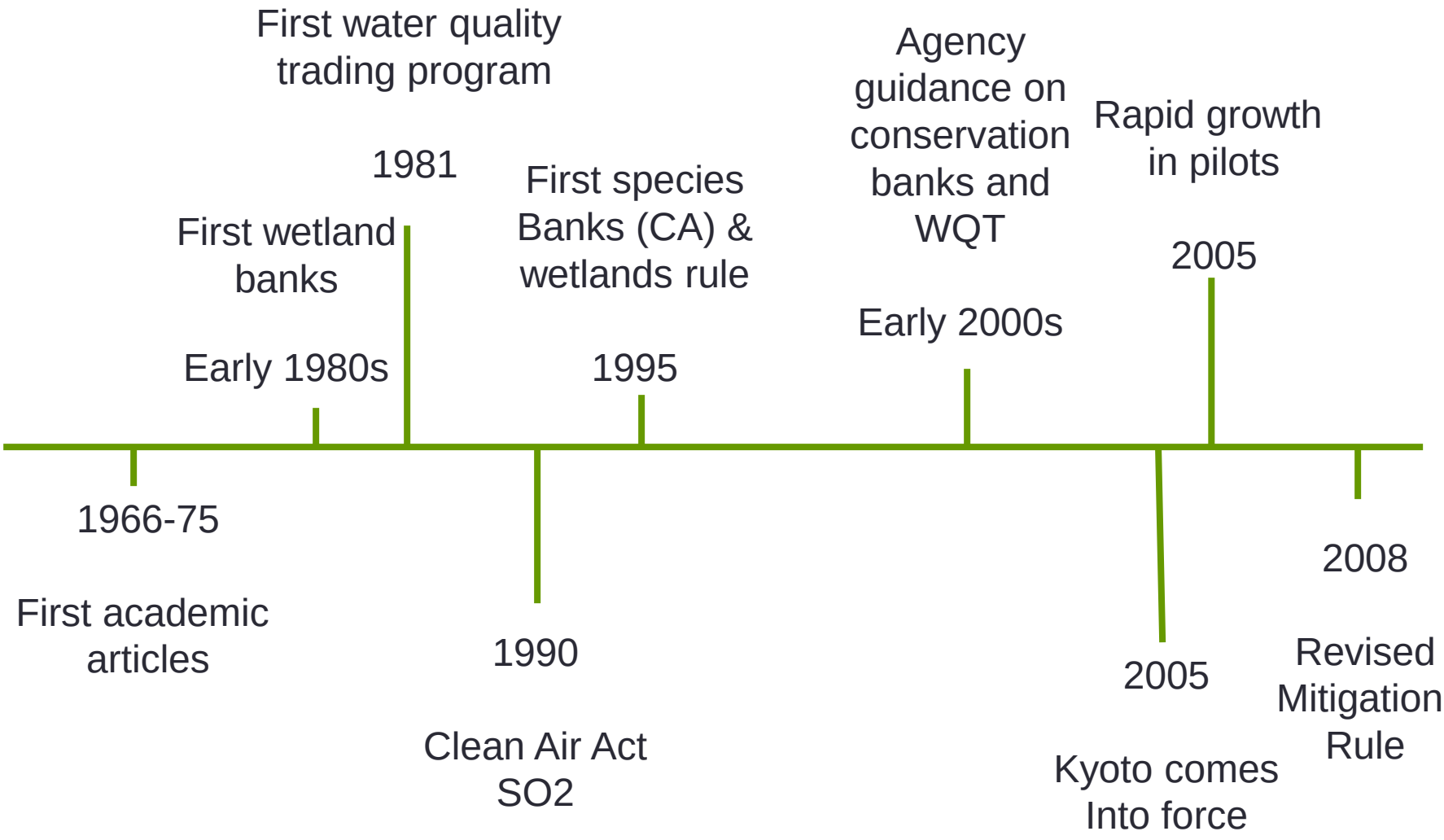
Investing how Mother Nature would



Source: data - www.deq.or.state.us; Image - The Freshwater Trust

History and Evolution of Ecosystem Markets

History of Ecosystem Markets



Ecosystem Markets

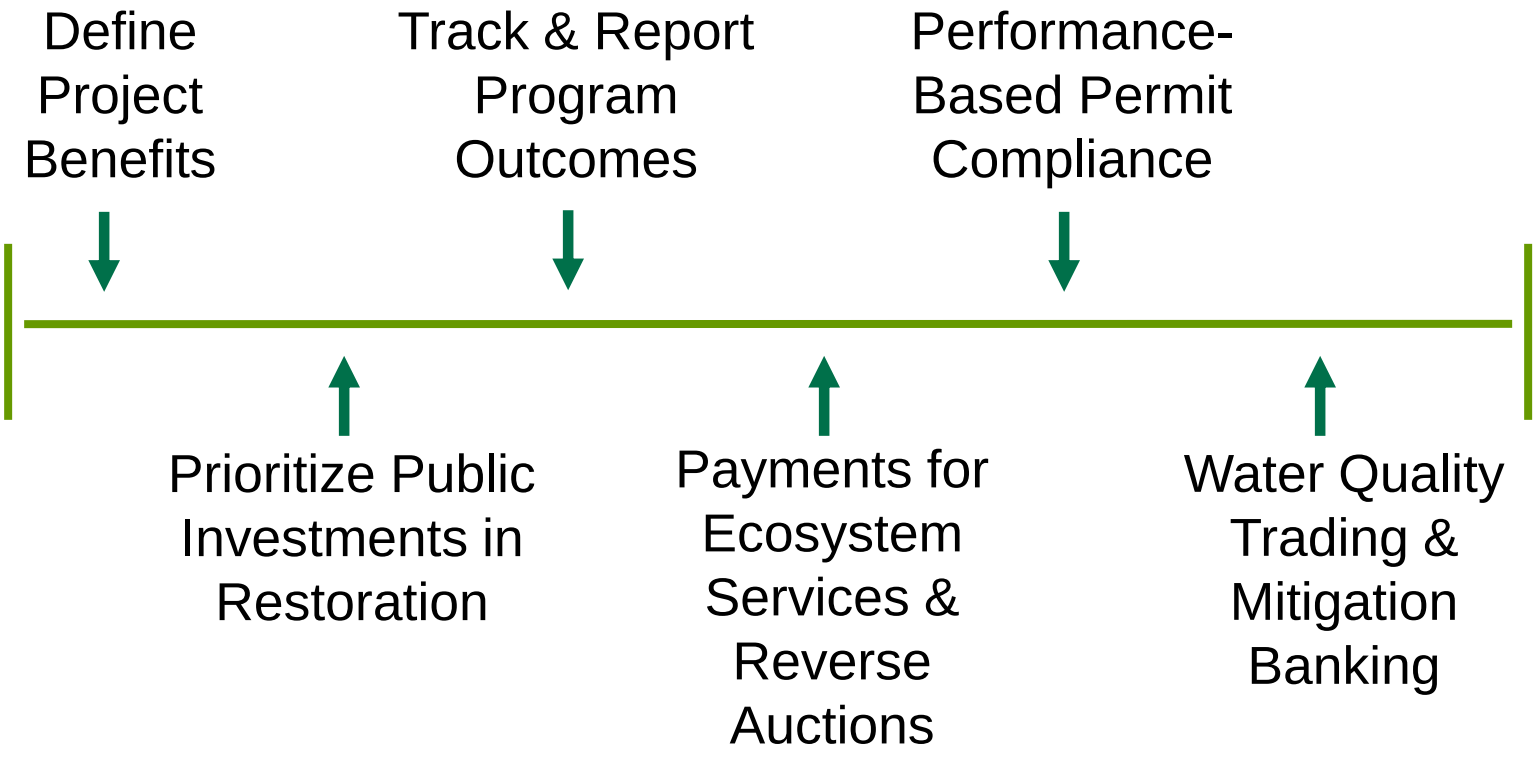
A new approach?

"Conservation will ultimately boil down to rewarding the private landowner who conserves the public interest."

Aldo Leopold

WORLD RESOURCES INSTITUTE

Environmental Accounting Applications



Existing Ecosystem Markets

Program types

- Air
- Water quality (nutrients & temp)
- Water quantity
- Habitat/Biodiversity
  - Wetlands
  - Species Conservation banking
- Others
- Tradable development rights
  - Natural resource damages
  - Hazard reduction

Existing Ecosystem Markets

More interesting programs

- Water transfer programs - Columbia Basin Water Transactions Program
- WQT: Oregon, Ohio, WI, Chesapeake Bay, FL, others
- Conservation Banking
- North Carolina mitigation

Three keys to success

Ecosystem Markets

- **CLEAR DEMAND:** Law/regulation, businesses, or funders that are on board
- **CLEAR RISK:** Third parties willing to finance and deliver compliance-grade projects
- **CLEAR PATH:** Approved standards and protocols for measuring ecosystem services and implementing credit-generating projects

Clear Demand

Reasons to invest

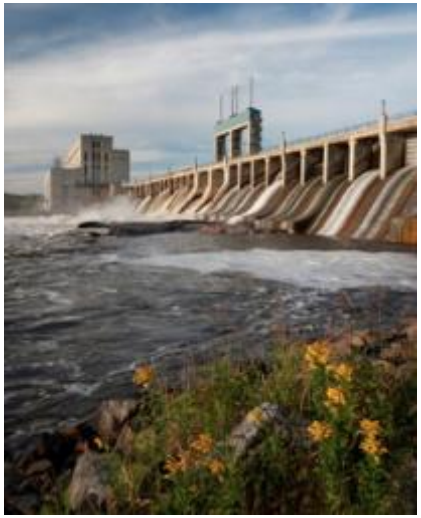
- Regulatory-driven transactions
- Business-driven transactions
- Public benefits-driven transactions

2008 Farm Bill

Clear Risk

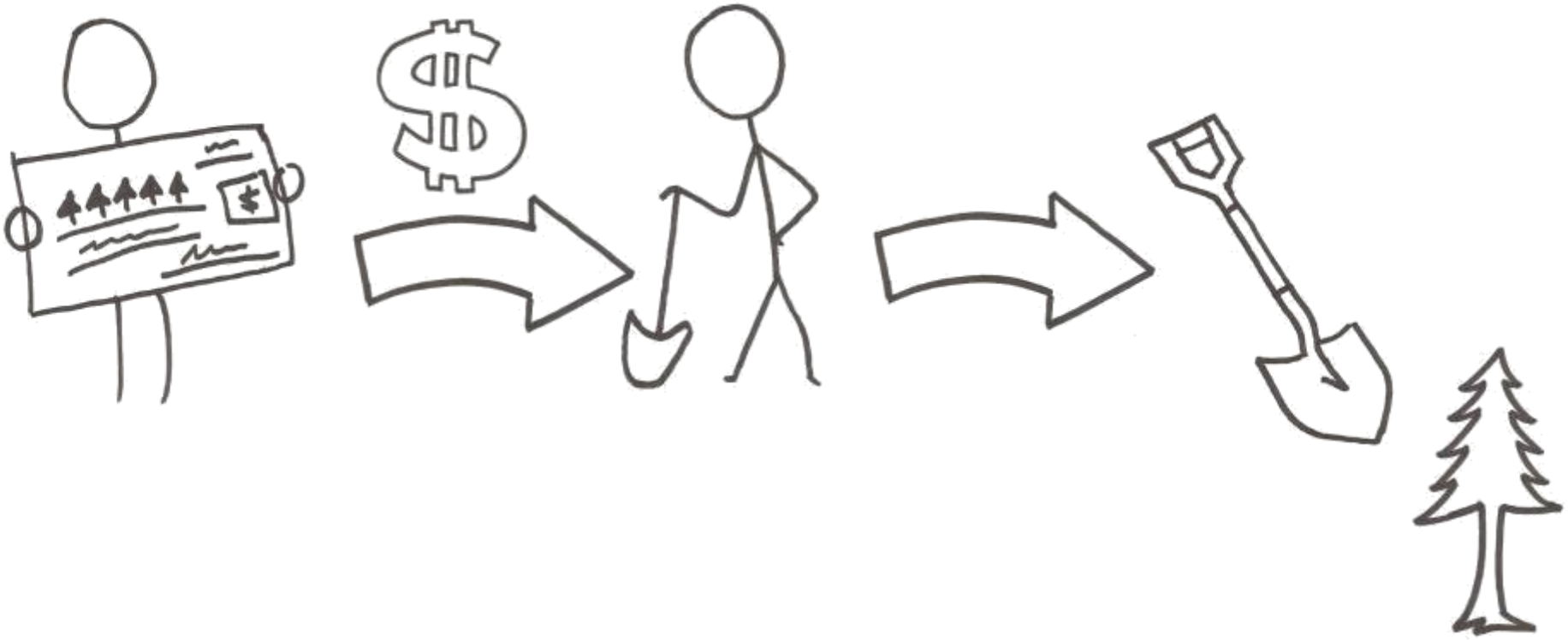
Building the confidence to invest

- Performance risk
  - Regulatory
  - Supply chain
- Upfront capital



Clear Path

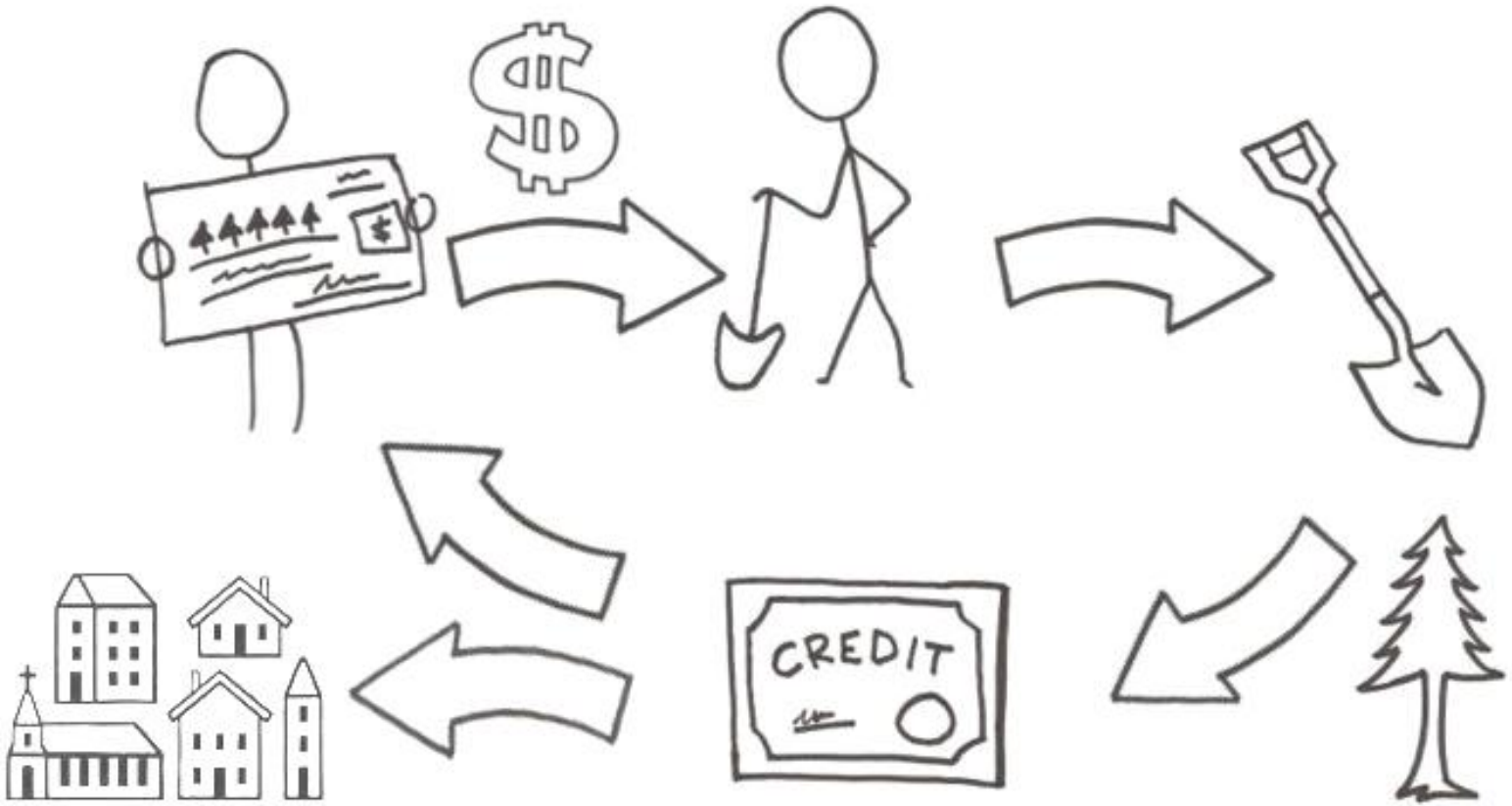
Linking actions to outcomes



Environmental Incentives

Clear Path

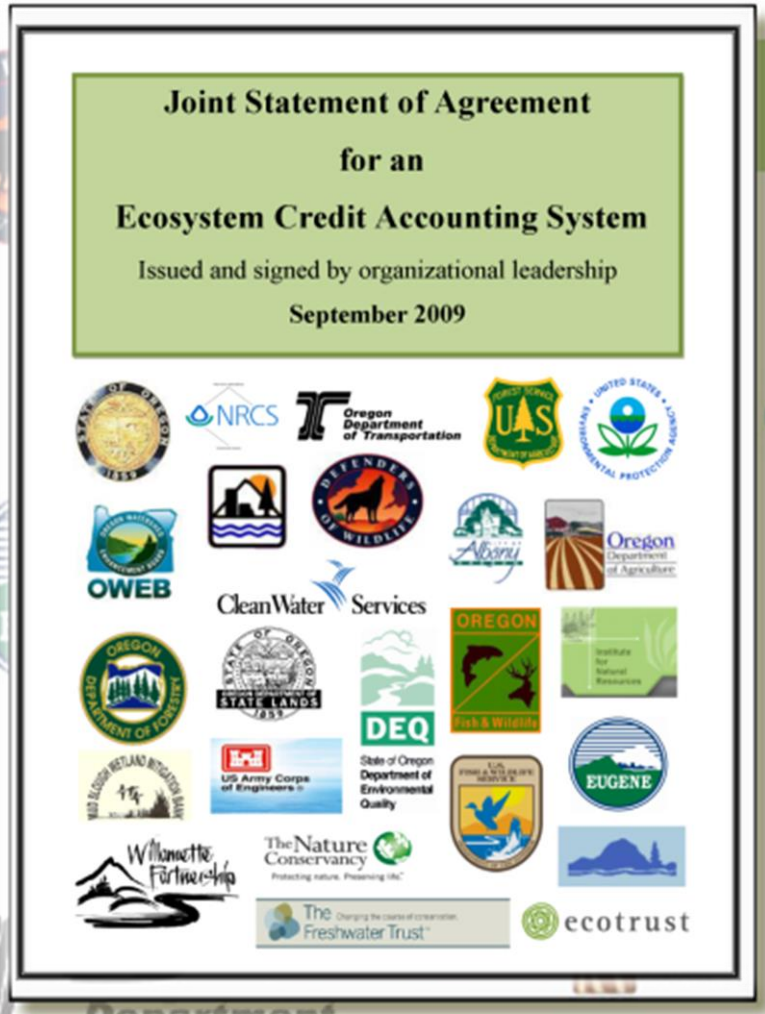
Linking actions to outcomes



Environmental Incentives

Crediting Protocol

Standards, Metrics, and Process



Crediting protocol approved for use

Crediting Protocol

Quantification = Translation = Investment

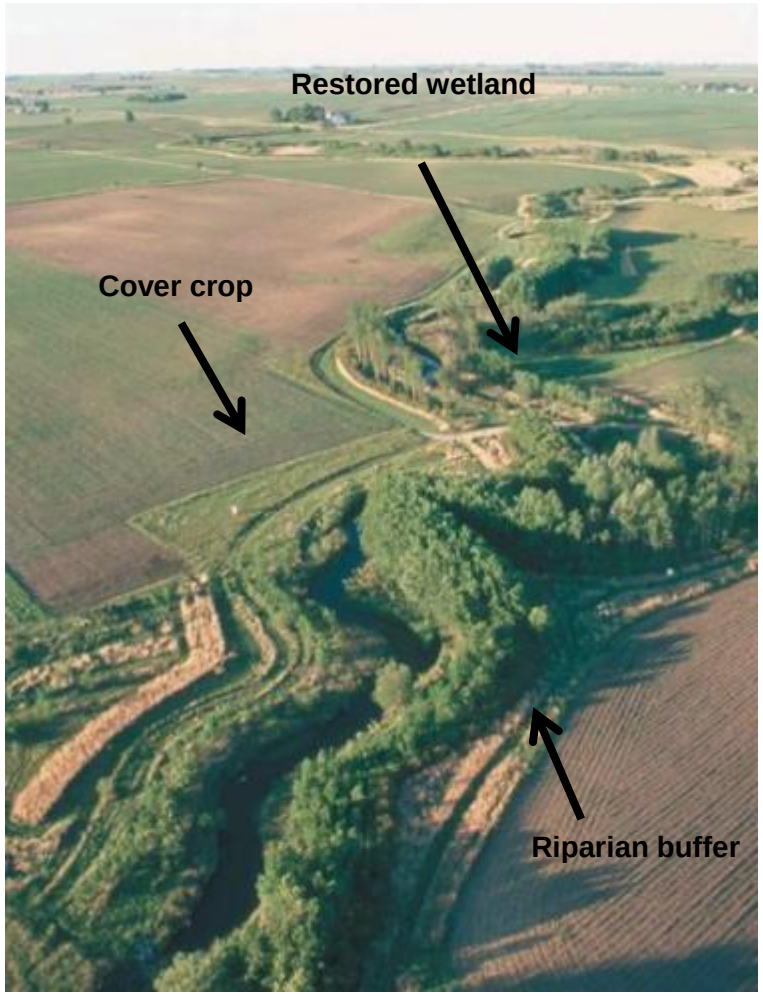
What did you do?

- Trees planted
- Acres treated
- Kilocalories

Source: Clean Water Services

Crediting Protocol

Quantification = Translation = Investment



What did you do?

- Practices installed
- Acres treated
- Lbs of Nitrogen, Phosphorus, Sediment

Rogue River, Oregon

With demand, infrastructure, and risk

Cooling Towers

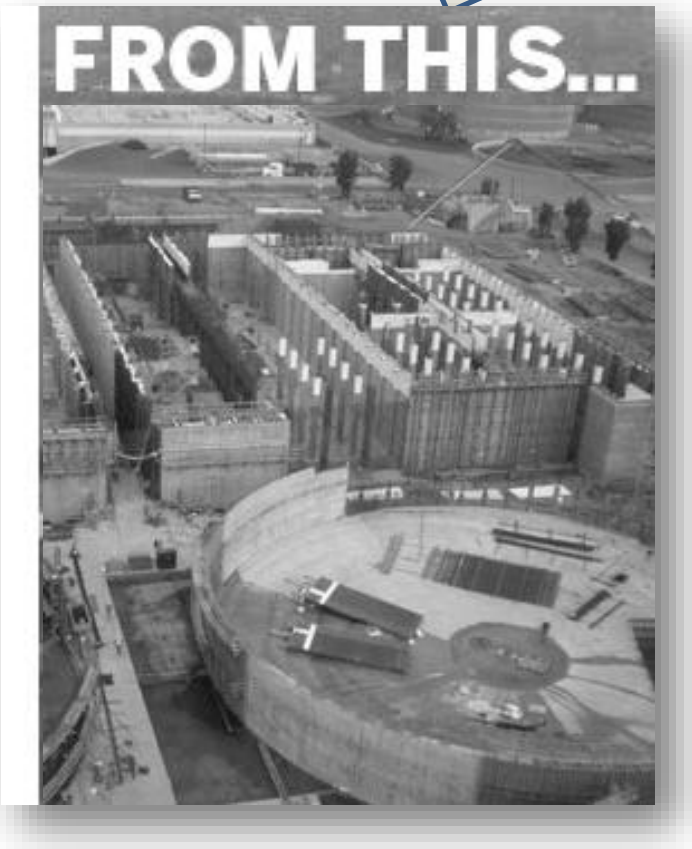
>$20 million

Holding Pond

$ 16 million

20+ miles of restoration

$8 million

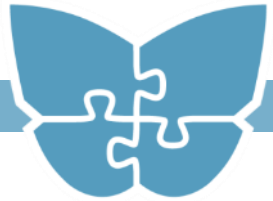


Foundation of a PES Program

1. Clear goals
2. Science to estimate benefits
3. Mechanism to track

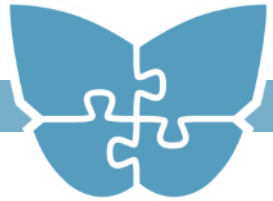
Key Design Components & Best Practices From Baseline to Business Models

Program Design Elements



1. Regulatory instruments to support trading;
2. Appropriate conditions for trading exist;
3. Eligibility for participants in the trading program; Setting Baseline
4. Quantifying environmental benefits;
5. Managing risk and uncertainty;
6. Credit characteristics;
7. Project implementation and assurance guidelines;
8. Project review, certification, and tracking
9. Compliance and enforcement;
10. Ongoing program improvement and performance tracking;
11. Defining roles, responsibilities, business and transaction models, and public participation.

Program Design Elements



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2. Appropriate conditions for trading exist;
3. **Eligibility for participants in the trading program: Setting Baseline**
4. **Quantifying environmental benefits;**
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6. Credit characteristics;
7. Project implementation and assurance guidelines;
8. **Project review, certification, and tracking**
9. Compliance and enforcement;
10. Ongoing program improvement and performance tracking;
11. **Defining roles, responsibilities, business and transaction models, and public participation**

Baseline

Trading baseline sets a minimum level of activity and/or environmental performance that the project developer must meet before being eligible to sell credits in the trading program.

Baseline

- What is included? How much is enough?
- How is it expressed – BMPs? Improvement?

Setting Baseline

The trading baseline takes into account existing landowner-level obligations that must be met prior to generating credits and can include:

- Regulatory requirements
- Watershed or conservation strategy targets
- Trading program obligations

Setting Baseline

Which regulations are applicable?

Regulators may want to specify which applicable regulations the trading program is concerned about.

Setting Baseline

What constitutes regulatory compliance?

The clearer state requirements can be, the easier they will be to translate into trading baselines.

Setting Baseline

How is compliance with existing regulations confirmed?

This may be an explicit authorization (e.g., permit), attestation, or the lack of a formal violation or enforcement action.

Expressing Baseline

- **Option A: Technology or practice-based -** A minimum set of BMPs

- **Option B: Performance-based baseline -** A level of environmental performance, may be % or absolute load.

Quantification

Is the means by which we determine the number of units of an environmental asset that is created or removed as a result of an action.

Quantification

- To model or not to model?
  - Modeling
  - Pre-determined rates
  - Direct monitoring

Which numbers?

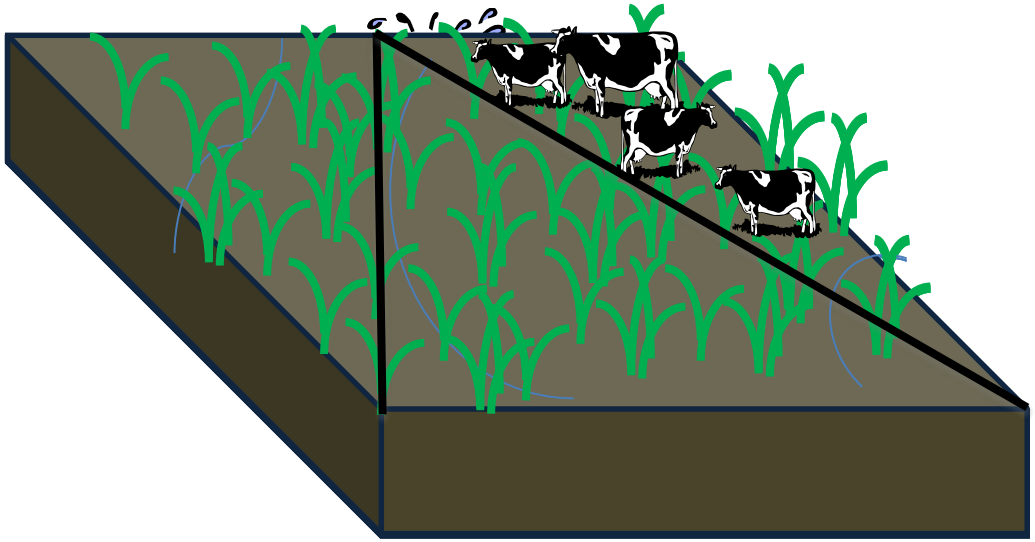
- Scale?
  - Spatial
  - Temporal

Which numbers?

- Outputs

What actions?

- Management scenarios



Other Considerations

- Is the measurement approach sensitive enough?
- Does it keep up with scientific understanding?

- User-friendly for resource experts?
- Practical and economical to set up and apply?
- Adequate technical support for application and updates?

What's good enough?

- Right people? …good process

1. Early stakeholder engagement
2. Transparency
3. Documentation
4. Acknowledgement of weaknesses

Project Review
~~Verification~~

The process of confirming that a credit-generating project is providing the benefits it promises.

The process includes “initial” and “ongoing” review.

Project Review

- What information is reviewed? For which projects?
- Intervals and scope for ongoing review (multi-year projects)
- Opportunities for public engagement and transparency

Initial Review

All? Some? None?

- **Option A:** Every project
- **Option B:** A subset
- **Option C: None**

Review Components

- Administrative review
  - Completeness
  - Correctness
- Technical review
- Confirmation of implementation and/or performance

Frequency & Intensity

- Every project, every year, everything
- Periodic cycle for full review, reduced scope during the interim years
- Review ceases/reduces after performance targets are met

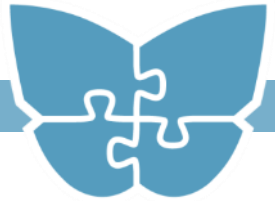
Public Review & Transparency

- Public review on every project
- Public review on the trading plan
- Disclosure of project documentation

Business Models

What are the financial considerations that must go into developing a payment for ecosystem service program?

Business Factors



Environmental Assets

Buyers

Market Infrastructure

Regulators

Market Operations

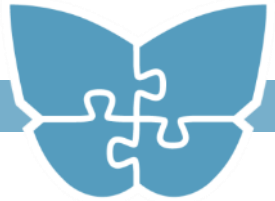
Sellers

Who Pays?

Environmental Assets

Buyers

Who Pays?



Buyers

Market Infrastructure

- Systems
- Protocols
- Technology
- People
- Adaptation

Regulators

Sellers

Who Pays?

- Variable transaction costs
  - Administrator review
  - 3rd Party Project Review
- Public Registry

Buyers

Regulators

Market Operations

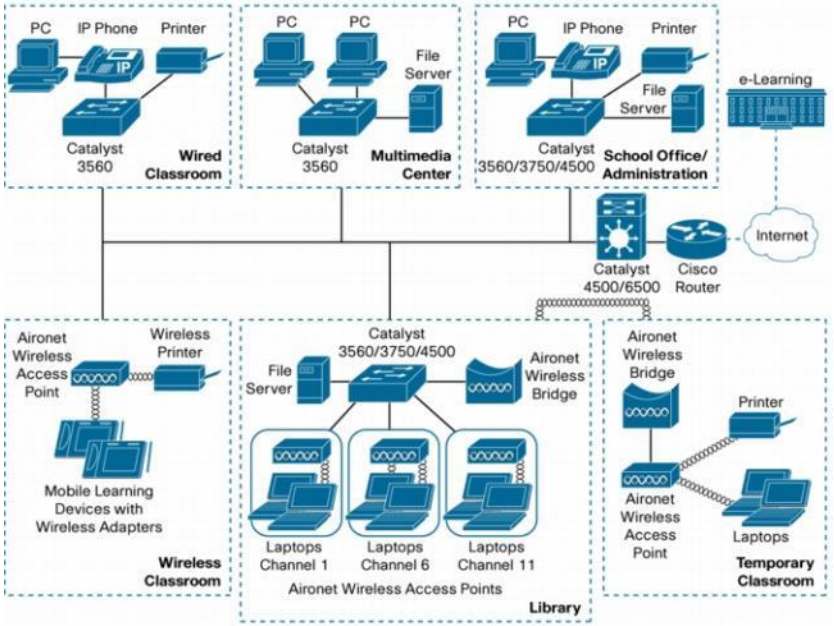
Business Considerations

Market Infrastructure

Market Operations

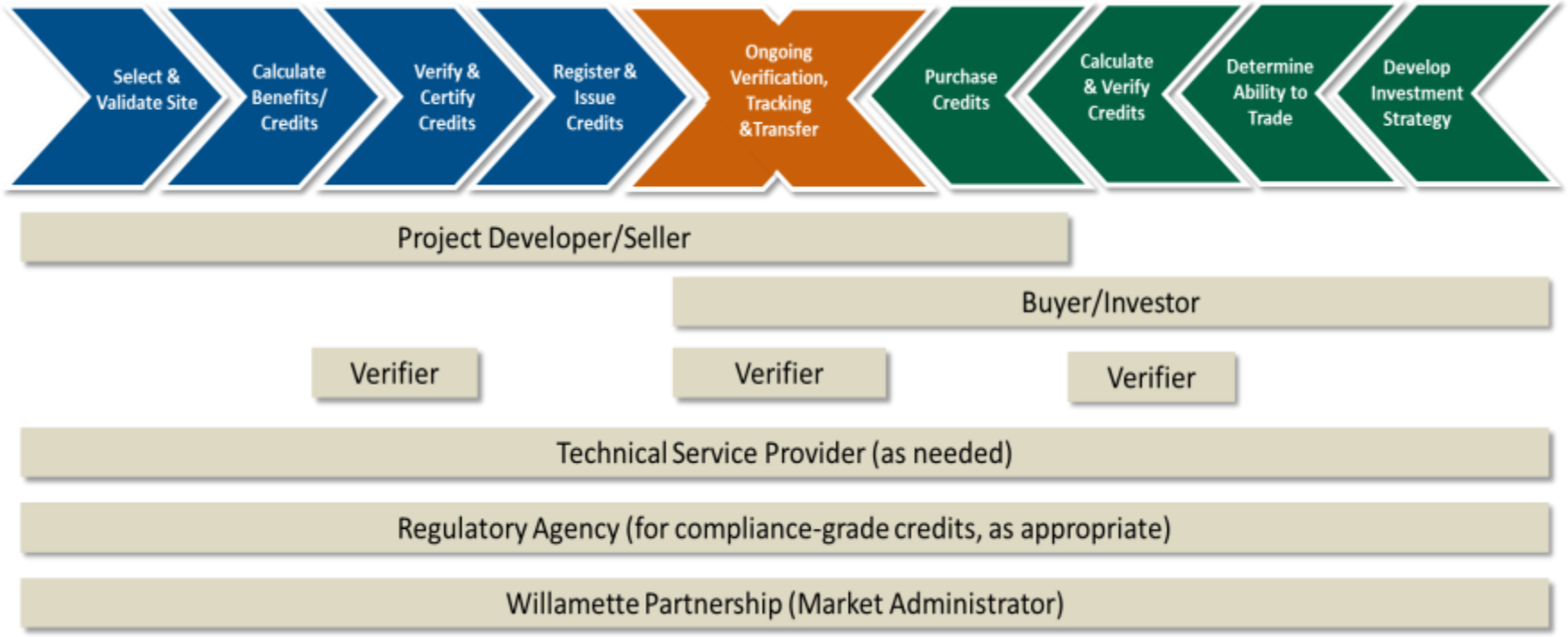
- Flexibility vs. stability

vs.



Crediting Protocol

Steps for buyers and sellers



Version 2 Credit Types

- Water Quality
  - Temperature (kcals/year)
  - Nutrients (lbs/year)
- Aquatic resources
  - Wetlands (func. acre)
  - Floodplain habitat (func. ac.)*
- Upland resources
  - Prairie habitat (func. acre)
  - Oak habitat (funct. acre)
  - Sagebrush/Sage grouse habitat (func. acre)*

Version 2 Eligible Actions

- Wetland (all but preservation)
- Salmonids (Planting, In- stream, Culverts, Sediment)
- Prairie (all)
- Temperature (Planting)
- Nutrients (Riparian buffers, animal exclusion, farm BMPs)
- Oak, Floodplain, Sagebrush (all)

Version 3 Credit Types?

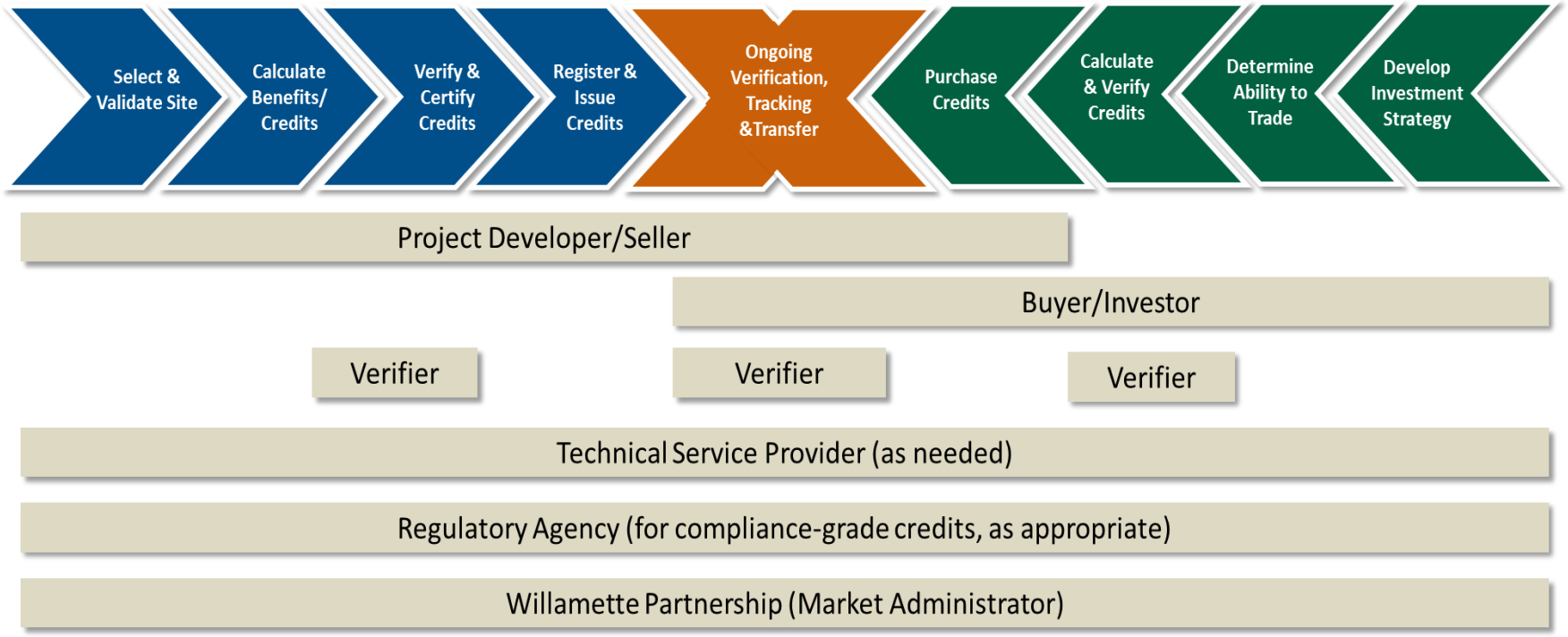
- Streams (func. linear foot)
- Species-specific modules

Version 3 Eligible Actions?

- Temperature (flow augmentation)
- Streams (enhance)

Crediting Protocol

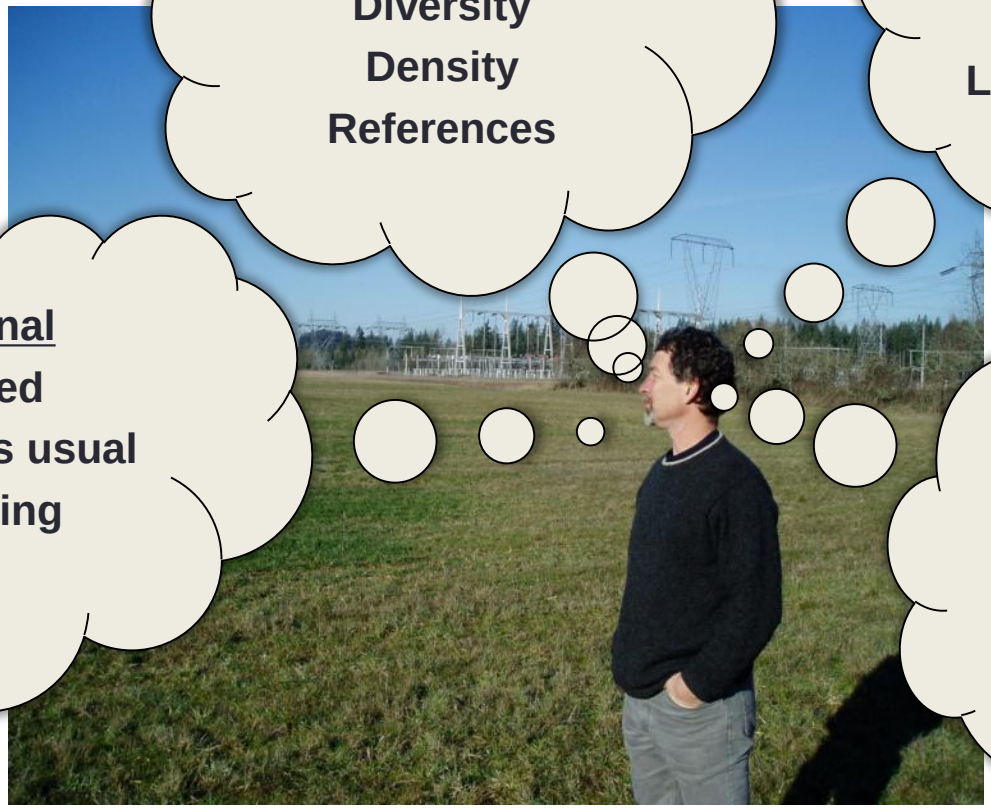
Steps for buyers and sellers



Validation & Eligibility

Select & Validate Site | Calculate Credits | Verify & Certify Credits | Register & Issue Credits | Ongoing Verification, Tracking &Transfer

Validation & Eligibility



Suitable
Local natives
Diversity
Density
References

Sustainable
Steward
Costs
Plans
Legal protection

Additional
Required
Business as usual
No flipping

Avoid
Minimize
Permitted

Select & Validate Site → Calculate Credits → Verify & Certify Credits → Register & Issue Credits → Ongoing Verification, Tracking &Transfer

Calculating Credits

Baseline

Select & Validate Site | Calculate Credits | Verify & Certify Credits | Register & Issue Credits | Ongoing Verification, Tracking &Transfer

Calculating Credits

Quantification Methods

Water Quality

- Oregon DEQ Shade-a-lator
- USDA Nutrient Tracking Tool (NTT)

Aquatic Habitat

- Counting on the Environment's Salmon Habitat Credit Calculation Method
- Counting on the Environment's Floodplain Habitat Metric
- Oregon Rapid Wetland Assessment Protocol (ORWAP)

Terrestrial Habitat

- Counting on the Environment's Prairie Credit Calculation Method
- Counting on the Environment's Sagebrush / Sage Grouse Habitat Metric
- Counting on the Environment's Oak Woodland Habitat Metric

Heat Source

- Created by Oregon Department of Environmental Quality to model thermal inputs to freshwater systems

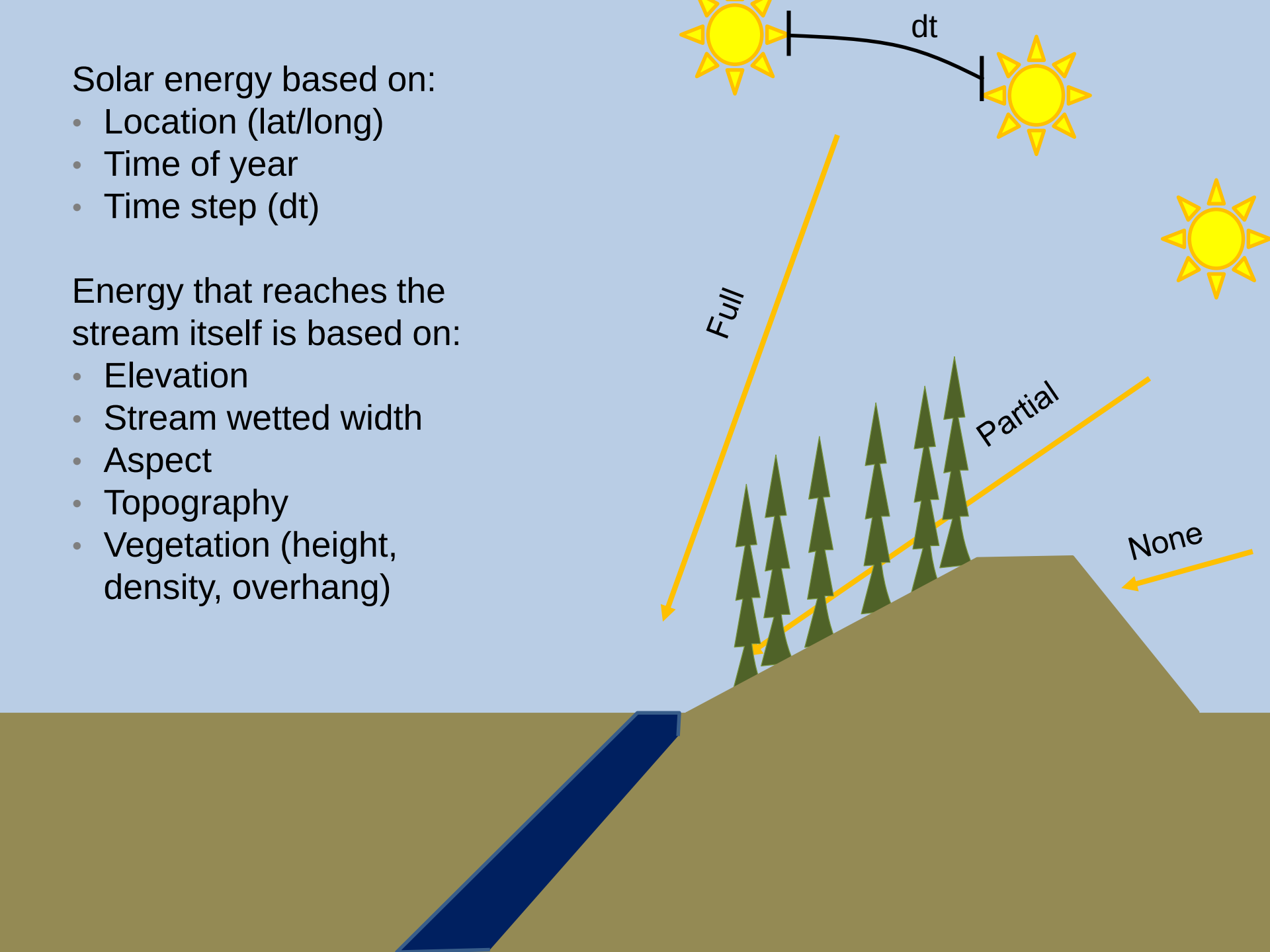
- Shade-a-lator is a component that models solar inputs

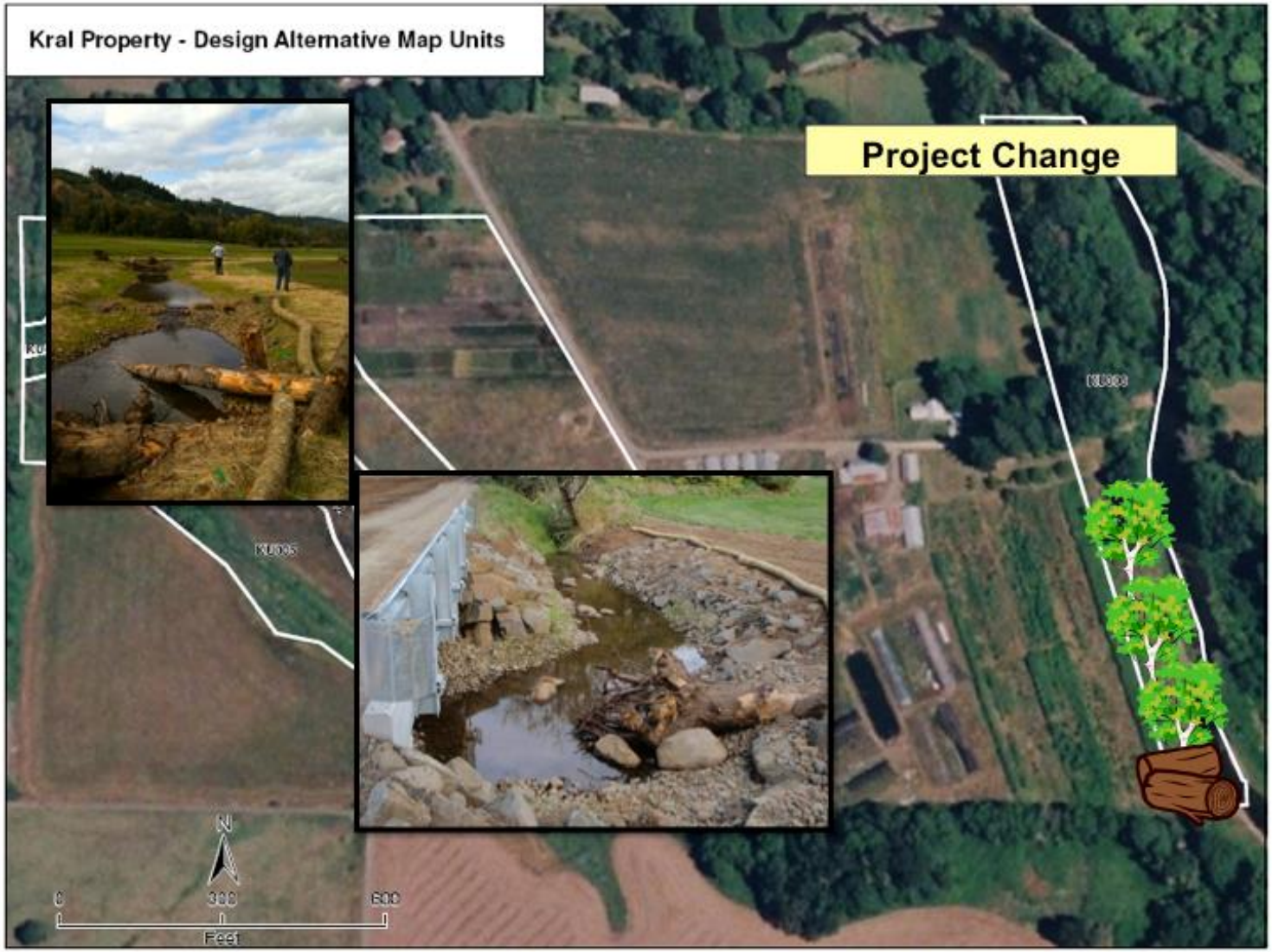
Solar energy based on:

- Location (lat/long)
- Time of year
- Time step (dt)

Energy that reaches the stream itself is based on:

- Elevation
- Stream wetted width
- Aspect
- Topography
- Vegetation (height, density, overhang)





Select & Validate Site | **Calculate Credits** | Verify & Certify Credits | Register & Issue Credits | Ongoing Verification, Tracking &Transfer

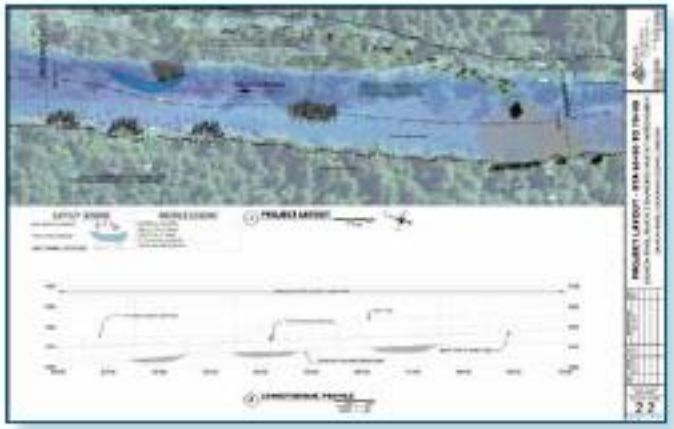
Calculating Credits

Credit Type	Baseline	Post-Restoration	Functional Gain
Wetlands *(Functional acres)*	1.07	11.12	10.05
Salmonid Habitat *(Functional in feet)*	723	1,429	707
Upland Prairie *(Functional acres)*	0.5	3.75	3.25
Temperature *(kcal/day)*	8,015,377	10,968,404	2,953,027

Reserve Pool & Trading Ratios

- Mechanism to encourage:
  - High priority projects
  - Minimal time loss in ecosystem function
- Ratios can be for Buyers or Sellers

Verification



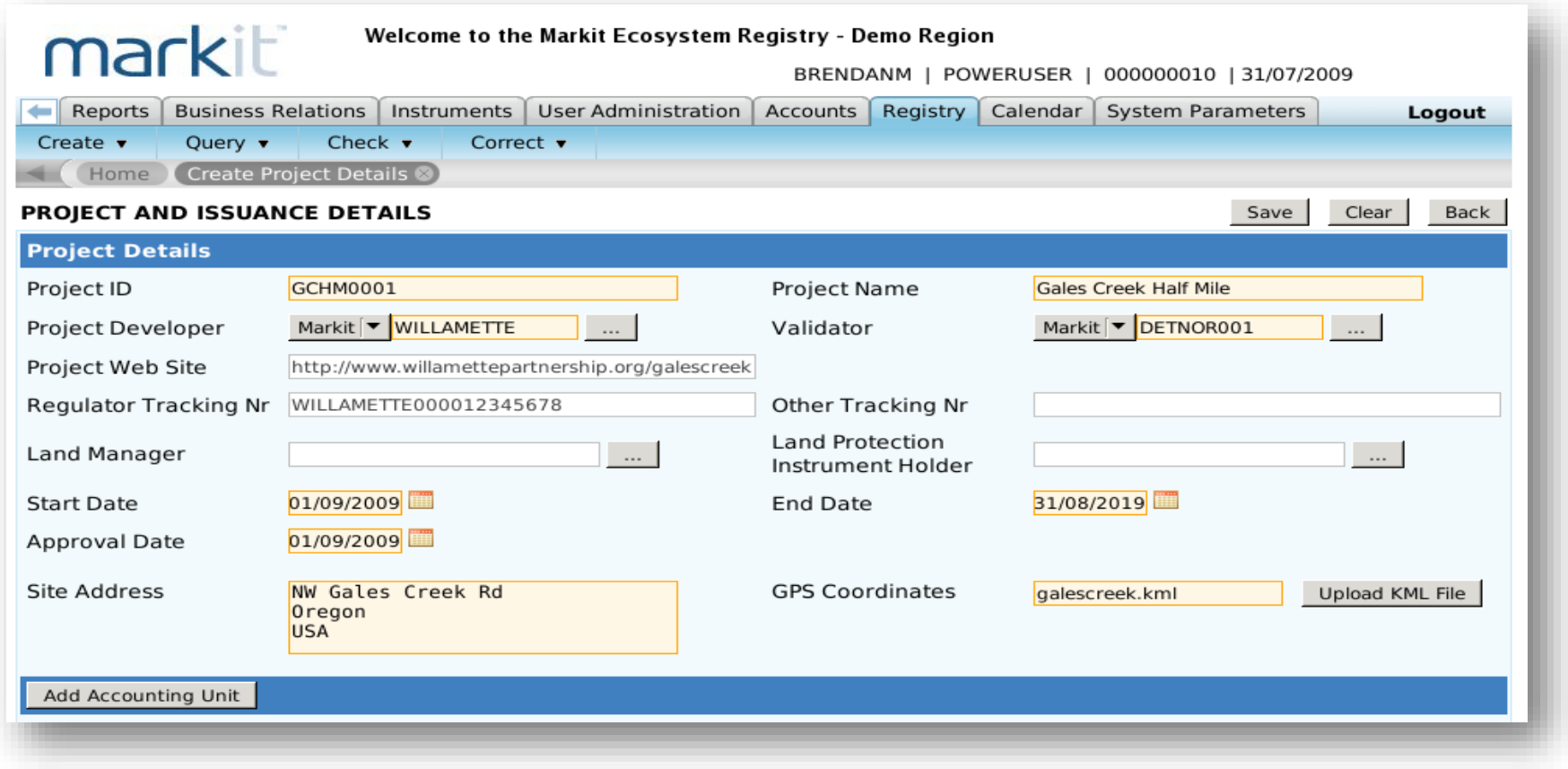
Select & Validate Site → Calculate Credits → **Verify & Certify Credits** → Register & Issue Credits → Ongoing Verification, Tracking &Transfer

Verification

- Goal: Protocols followed, Actions complete, Documentation in place, Estimates reasonable +/- 15%
- Activities: Review docs, review map unit boundaries, spot check data sheets.
- Assigning accredited verifiers

Registration & Tracking

Secure, transparent & publicly accessible



Credit Releases, Sales, Re-sales, & Performance Liability

Credit Type	TOTAL	30% As-Built	50% Function	100% Function
Wetland (acres)	8.84	2.95	4.42	8.84
Salmonid (ln ft)	622	207	311	622
Prairie (acres)	N/A	N/A	N/A	N/A
Water Temp. (kcal/day)	2,598,664	2,598,664	2,598,664	2,598,664

Verification Cycle

- Year 1, Year 2-4, Change verifiers, Repeat
- Agency certification

Adaptive Management

- Track performance of all projects
- Convene Governing Body as needed as new information and issues emerge
- Initiate any policy changes needed for system implementation

Traditional Restoration vs. Compliance Grade Credits

Traditional Restoration Steps	Compliance-Grade Credit Generation Steps
Identify project site	Identify project site
Fundraising	Financing
	Negotiate 20+ year contract with landowner
	Collect baseline data
Project design	Project design
	Estimated credit values
Implement	Implement
	Verification that implementation meets standards
	Certification that credits meet accounting protocols
	Credit registration
Monitoring and maintenance (Years 1 – 3)	Monitoring and maintenance (Years 1 – 3)
	Monitoring and maintenance (Years 4 – 20)
	Annual payments to landowners (20+ years)

= Local Project Managers

= The Freshwater Trust

Buyers

Determine Credit Quantity

- Calculate credits with applicable quantification methods
- Apply trading ratios and reserve pool contributions
- Verification and approval by regulators

Buyers

Purchasing Credits

- Exchange
- Single-party contract
- Reverse auction

Rogue River, Oregon

With demand, infrastructure, and risk

Cooling Towers

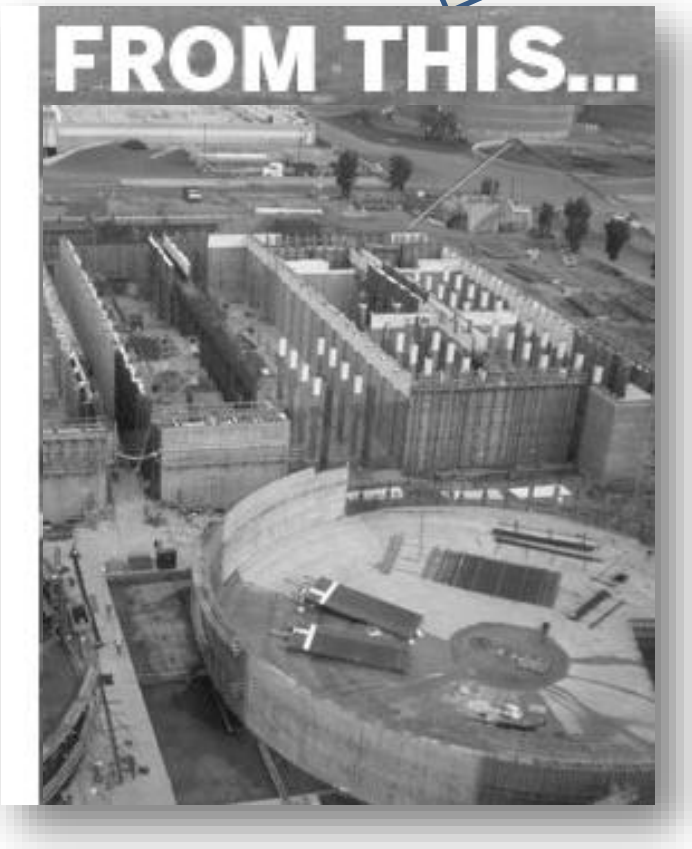
>$20 million

Holding Pond

$ 16 million

20+ miles of restoration

$8 million

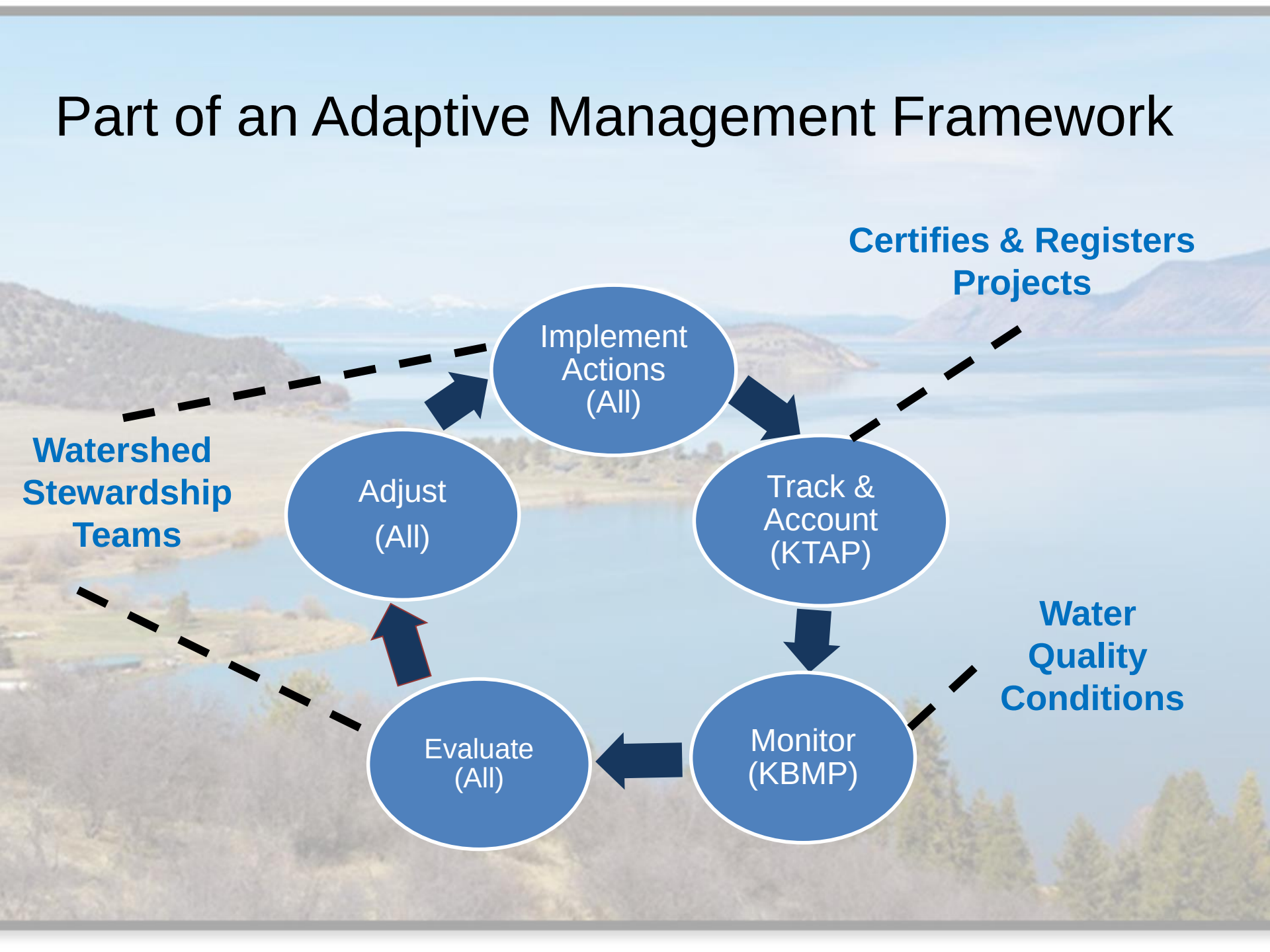


Klamath Tracking & Accounting Program

What?

- Consistent framework for tracking WQ improvements
- Component of adaptive management
- Potential tool for implementing regulatory programs

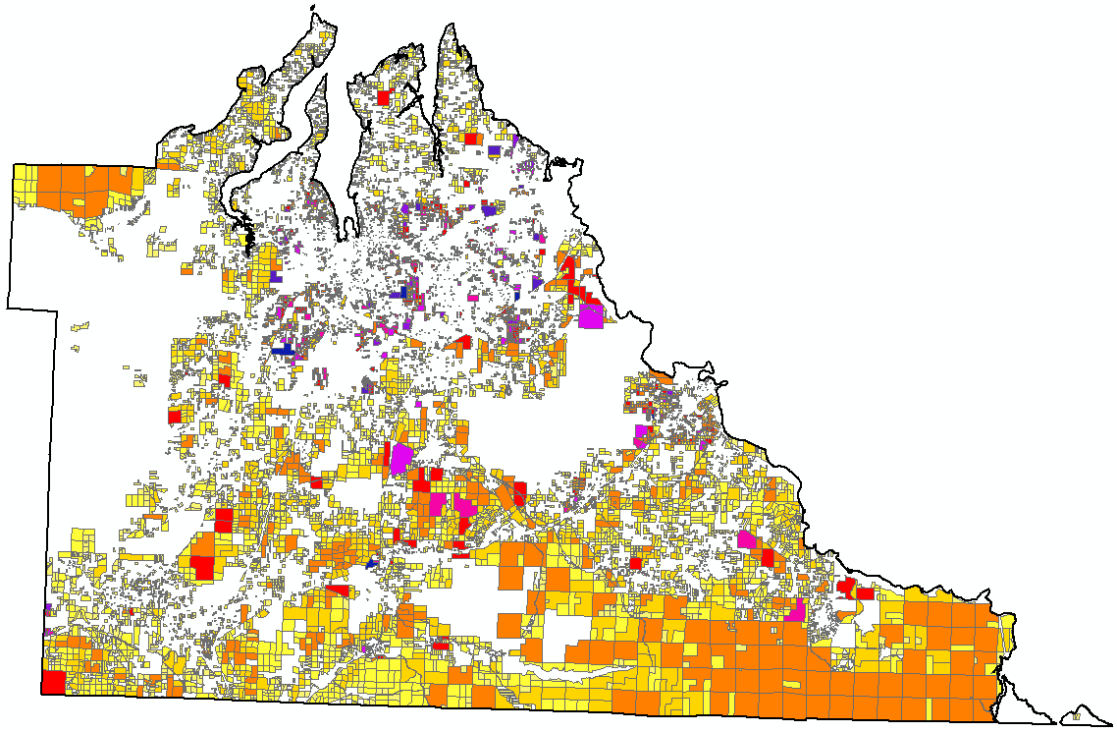
Part of an Adaptive Management Framework



Thurston County, Washington

Habitat Conservation Plan

- Recovery-based conservation strategy
- In-lieu fee mitigation
- Permanent protection
- 3 covered habitats, 13 covered species



Thurston County, Washington

Prairie Habitat Assessment Methodology

Currency: Weighted Acres

Ecological Attributes

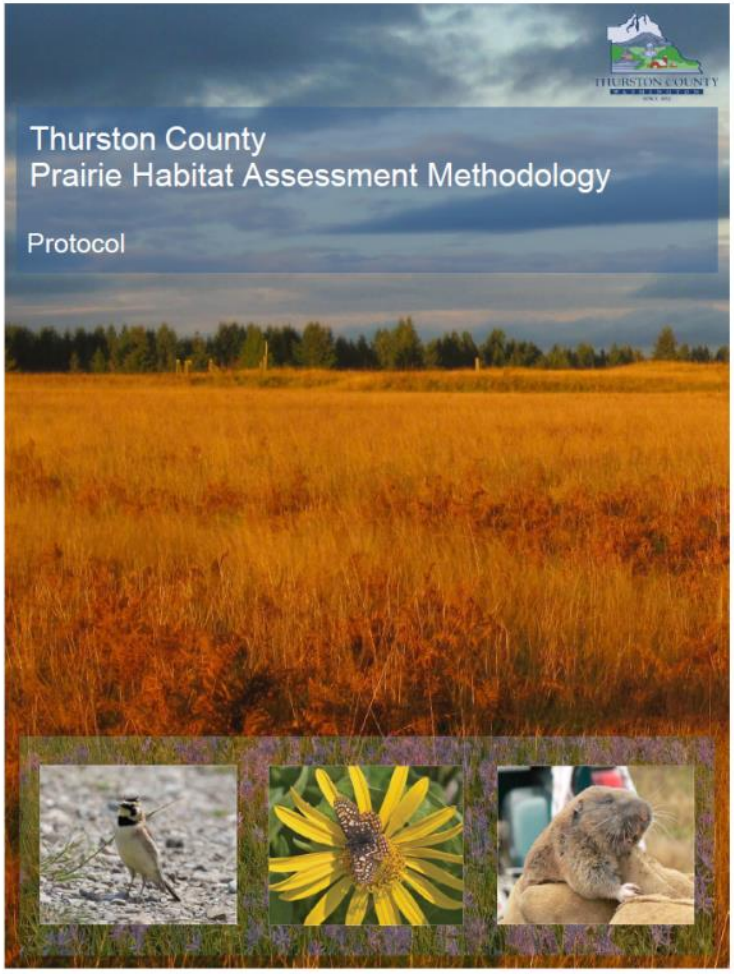
- Prairie habitat quality and extent

Landscape Context

- Connectivity
- Adjacent land use and protection
- Proximity to reserve network sites

Population

- Presence and abundance of species



Moving Forward

- Making the business case
- Increasing consistency
- Build consensus around scientific methods and safety factors
- Prioritization, focus on outcomes
- Effectiveness monitoring/feedback loops to improve science

Questions?

WILLAMETTE PARTNERSHIP

Carrie Sanneman – Sanneman@willamettepartnership.org

Sam Baraso – Baraso@willamettepartnership.org

Future Presentations

Title	When / Where
Linking Health and Nature: Making Sure People Are Really Part of Ecosystem Services (Sam)	Wednesday, 12/10, 12:15 – 1:20PM Townhall, Grand Ballroom Salons D-E
Ecosystem Services, Habitat Banks, and the Endangered Species Act (Sam)	Wednesday, 12/10, 2:35 – 2:55PM Session, 4H, Grand Ballroom Salon K
Linking State and Federal Policies to Protect Prairies, Pollinators and Other Critters in the Pacific Northwest (Sam)	Wednesday, 12/10, 3:45 – 5:30PM Session 5D, Grand Ballroom Salon D-E
Scaling Up Water Quality Trading Through a National Network Approach (Carrie)	Thursday, 12/11, 1:30 – 3:15PM Session 7C, Grand Ballroom Salon C