

A Vision for Future Integrated Floodplain Management in the Columbia Basin

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ISRP



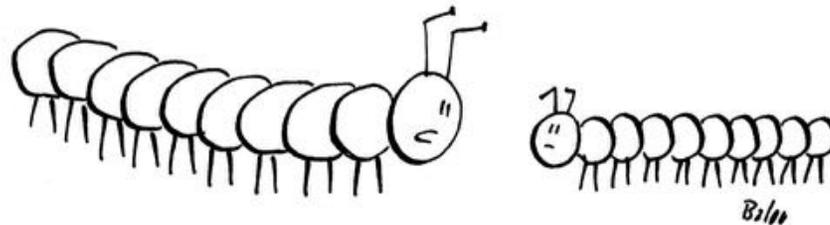
ISAB



Future of Our Salmon Conference – 19 October 2016, Portland

Our Working Vision

Implementing management practices, science-based evaluations and policy decisions compatible with the long-term vitality of floodplains, with the maintenance, protection and restoration of aquatic and terrestrial communities that depend on floodplains, and with the provision of First Foods – *water, salmon, game, cous, berries* – for Tribes and communities along the rivers



"Strength and speed are useful, son, but coordination is *crucial!*"

A Vision for Future Integrated Floodplain Management in the Columbia Basin

Could there be a more complex and contentious topic?

Possibly but this one offers great challenges as well as outstanding benefits and opportunities for innovative environmental-social solutions

Photo: Wallick et al. 2013

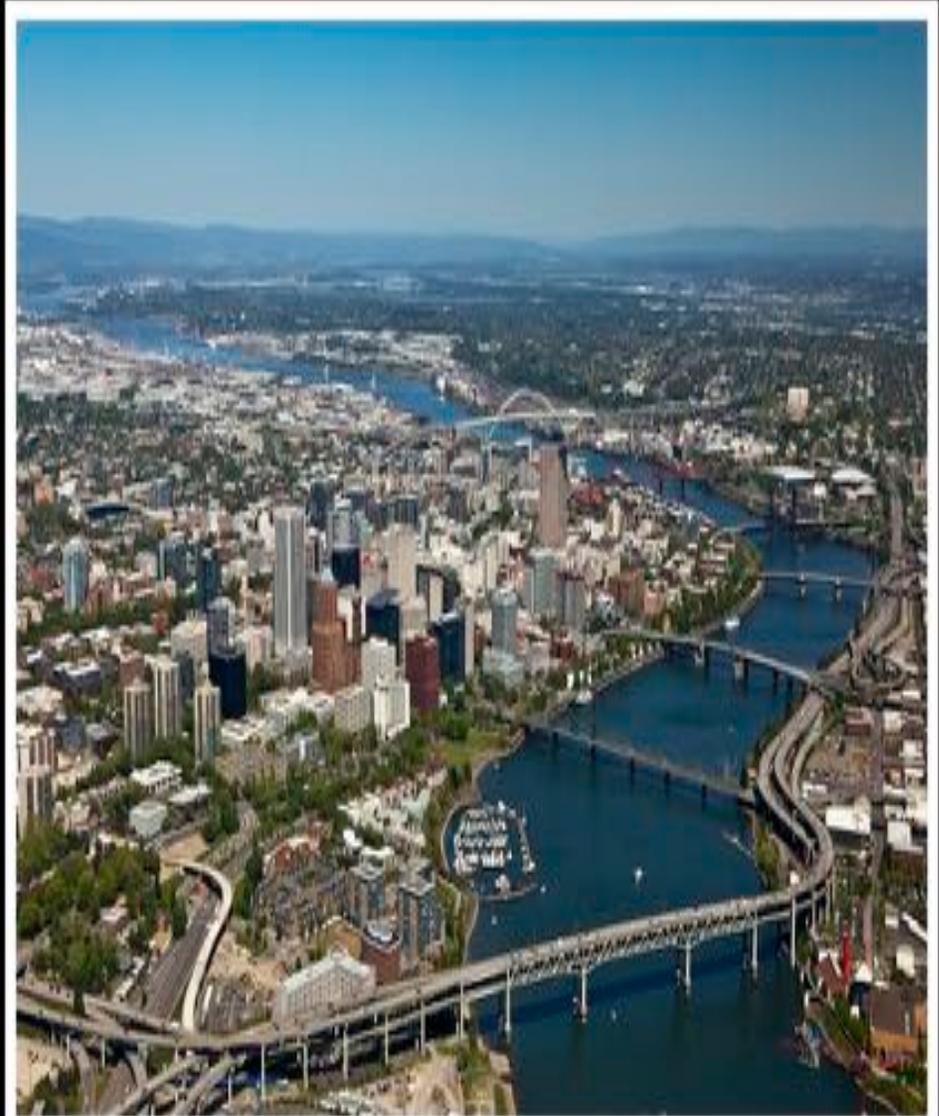


Floodplains: Changing Social Conditions

Numerous businesses and towns have been built on floodplains. Reasons:

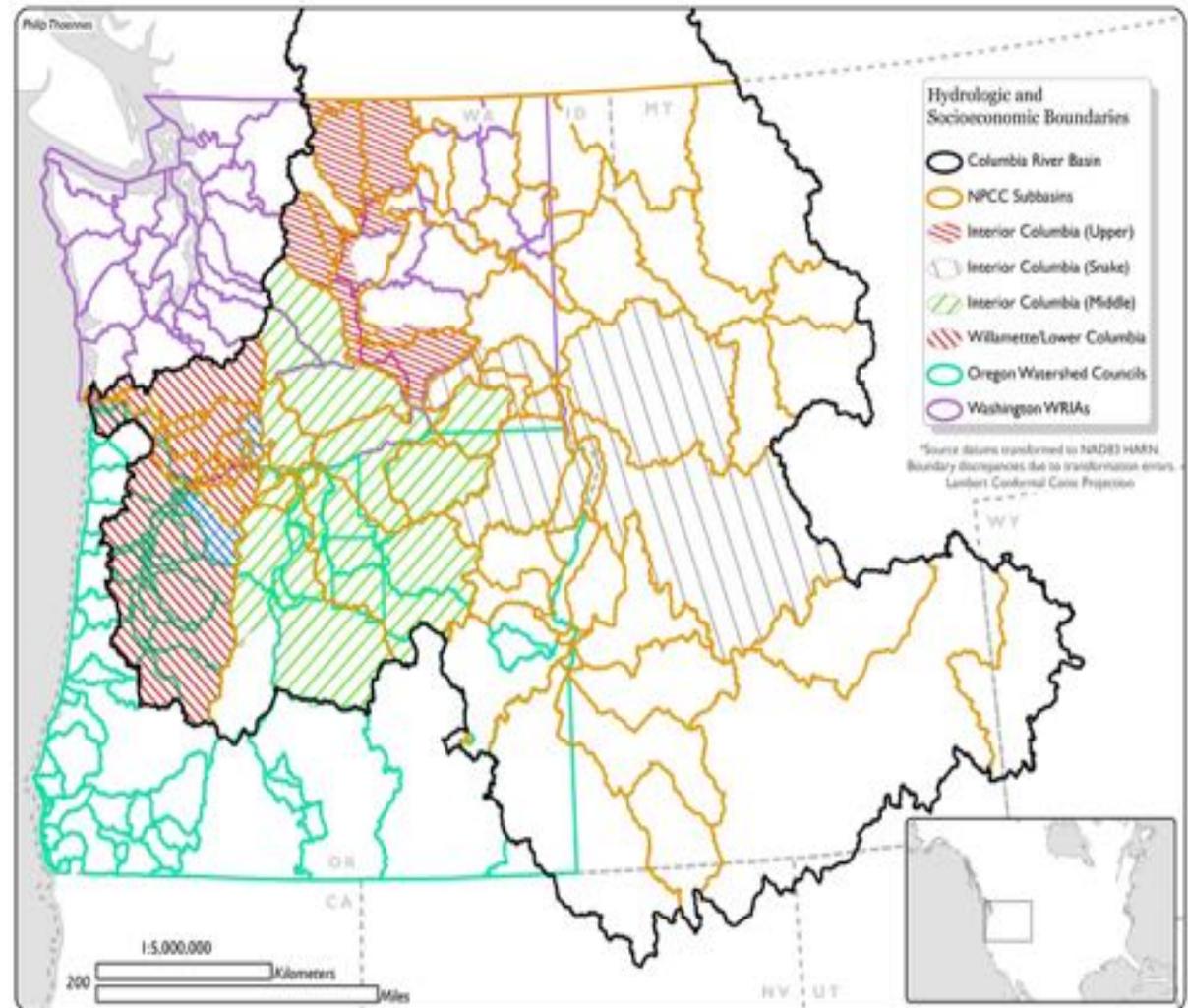
- Access to fresh water
- Fertility of floodplain land for farming
- Cheap transportation, via rivers and railroads, which often follow rivers
- Ease of development on flat land
- Transfer of wastes

As a consequence, great public effort and expense has been directed toward the protection of these social (cultural) investments – and this protection may be intensified in the future



Columbia Basin: The Social Context

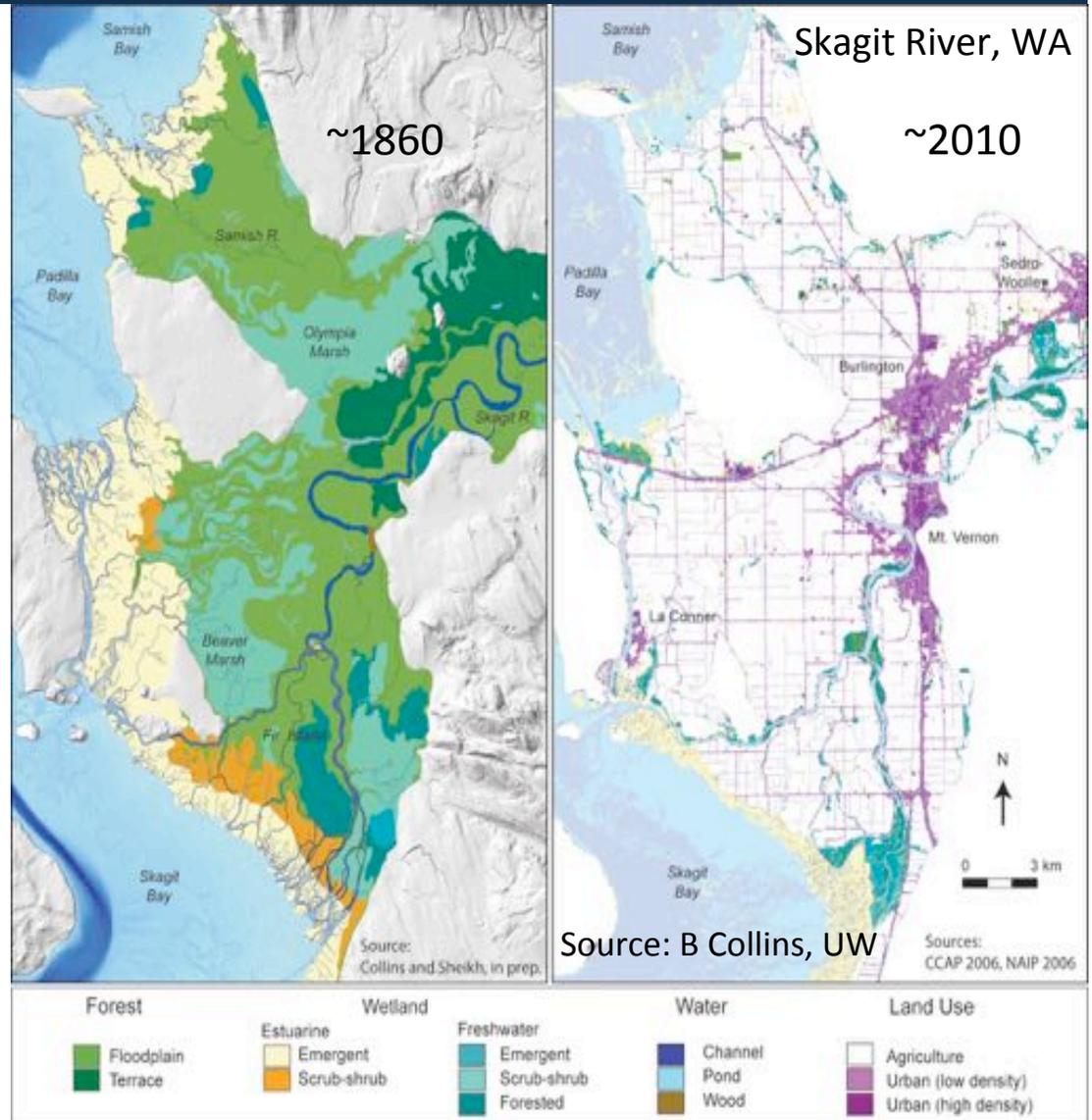
- Two countries
- 7 USA states
- 15 Native American Tribes (+17 in Canada)
- 11 ecological provinces
- 62 subbasins (USA)
- >100 counties + many cities and other entities representing patterns of ownership, management, or regulatory jurisdiction (e.g., USFS, BLM, irrigation & water districts)



Floodplains: Changing Environmental Conditions

Extensive physical alterations to water and sediment supplies, to stream channels, and to how land is used have resulted in broad environmental changes over the last two centuries. Changes include:

- Ecosystem-scale alterations from widespread use of artificial chemicals
- Proliferation and range expansions of non-native species
- Range contractions and loss of life history diversity by native species
- Pervasive alterations to riparian zones and food supplies
- Climate change



Moving Forward

There are unparalleled opportunities for improving floodplain functions as long as two simultaneous but complementary approaches are implemented (ecological and sociological) and seamlessly integrated

Ecological

- Establish the appropriate spatial scale
- Synthesize existing information
- Identify essential knowledge and data gaps
- Select priority floodplains for conservation and restoration
- Allow periodic overbank flooding

Sociological

- Identify the diversity and spatial distribution of perspectives for floodplain use
- Identify essential policy issues
- Select effective approaches for public, Tribal and governmental interactions
- Craft a comprehensive strategy for integrating the ecological and cultural demands (uses) of floodplains

Ongoing Efforts in the Columbia Basin

Northwest Power and Conservation Council's 2014 Fish and Wildlife Program

The Program specifically calls for (among other related actions):

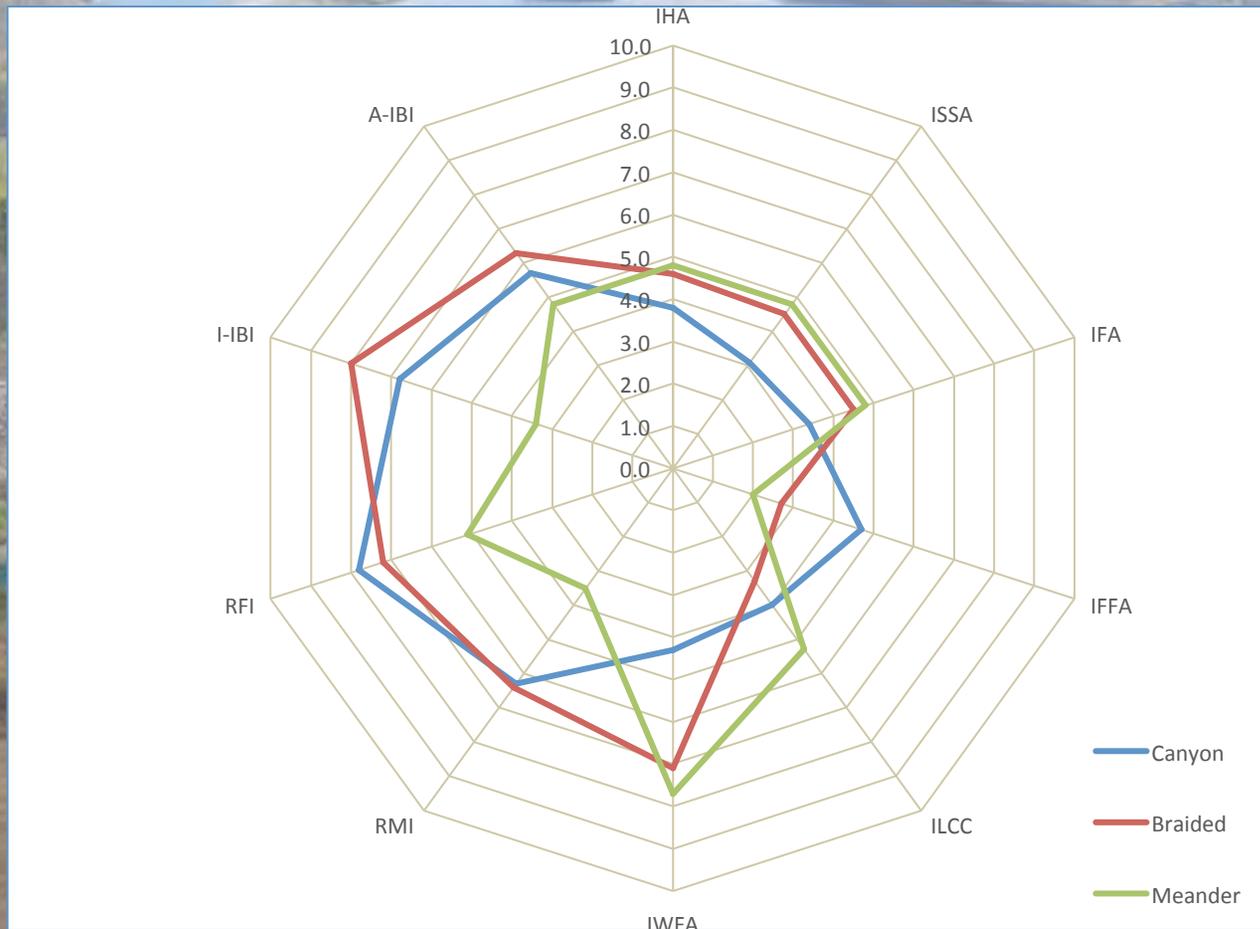
- Protection and enhancement of ecological connectivity between aquatic areas, riparian zones, floodplains, side channels, and uplands
- Reconnecting floodplains through passive and active improvements in channel structure and geomorphology and re-establishing natural river processes - with special emphasis on the estuary and lower Columbia River
- Investigate the potential to further improve ecosystem function and floodplain connectivity.

These actions are evident in several socially and ecologically comprehensive projects:

- Kootenai River
- Willamette River
- Columbia River Estuary

Kootenai River Floodplain

Conducting Active Restoration and Quantifying Ecological Losses



Operational Loss Assessment Indices

24/2012
Source: Kootenai Tribe

Present Native Habitats: 123,266 acres

'Recovery challenged' areas: 68,231 acres

'Recoverable' areas: 77,210 acres

Managed areas, recoverable

Astoria

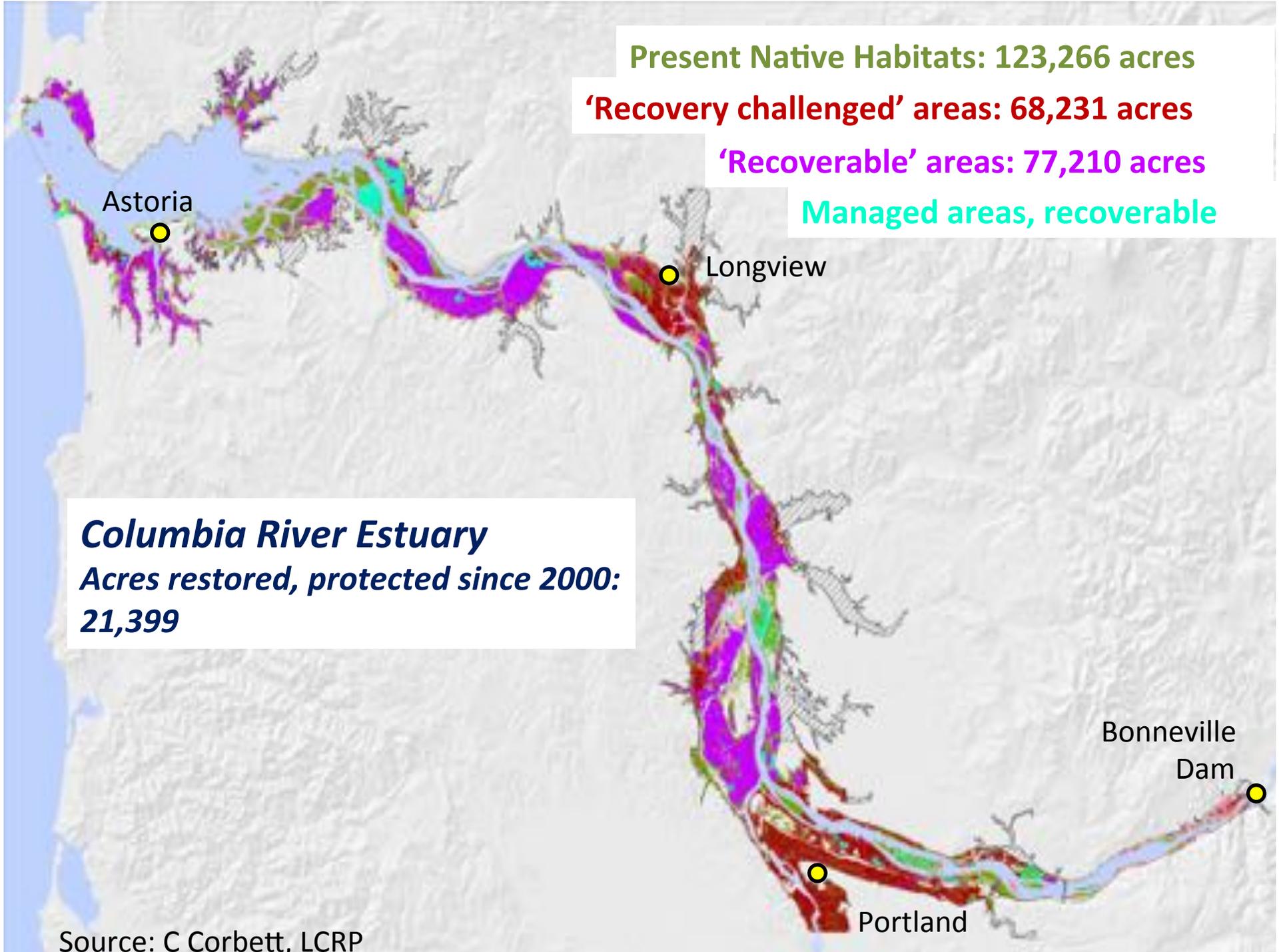
Longview

Columbia River Estuary
Acres restored, protected since 2000:
21,399

Bonneville
Dam

Portland

Source: C Corbett, LCRP



Integrated Floodplain Management

What will it Take to be Successful?

Golden rules for successful integrated floodplain management:

1. Link to socio-economic values and integrate with broader planning and development activities
2. Involve all relevant stakeholders
3. Identify, understand, and work with watershed and riverine processes
4. Restore floodplain structure and function by working at the appropriate scale to address limiting factors to river-floodplain health
5. Set clear, achievable and measurable goals
6. Build resilience in response to future change
7. Ensure the sustainability of management strategies and restoration actions
8. Monitor, evaluate, adapt and provide evidence of restoration outcomes

Adapted from Speed et al (2016) and Pettit et al (2016)



Photo: Wallick et al. 2013

Developing an Action-Based Vision for a Basin-wide Program

Major Tasks for Floodplain Policy & Science

- **Determine and articulate the ultimate goal.** Is it biological integrity, salmonid production, an integrated social/ecological system with measurable outputs, or some other target?
- **Implement key social linkages.** Initiate policy discussions related to flooding, build regional communication for understanding multiple uses of floodplains, and build adaptive capacity of decision-makers and the public.
- **Quantify the spatial distribution and area of floodplains.** What is the distribution and diversity of floodplain landforms and habitats in the Columbia River and its tributaries? What is the footprint of today's functional floodplain?
- **Determine the aggregate capacity of floodplains to hold water and recharge aquifers**
- **Establish accurate monitoring and evaluation of aggregate floodplain conditions.** This includes operational loss assessments.
- **Estimate the aggregate potential of multiuse floodplains for maintaining water quality, fish, biodiversity, and agricultural production.**
- **Identify floodplains with unusual potential for restoration and conservation, as well as for demonstration sites for ecological-social integration**
- **Define quantifiable restoration/conservation targets and establish timelines.** Where and how much floodplain is needed to reach the ultimate goal?



Key Challenges for Integrated Floodplain Management in the Columbia Basin

- **Re-establish adequate fluxes of bedload, suspended sediments and large wood onto floodplains**

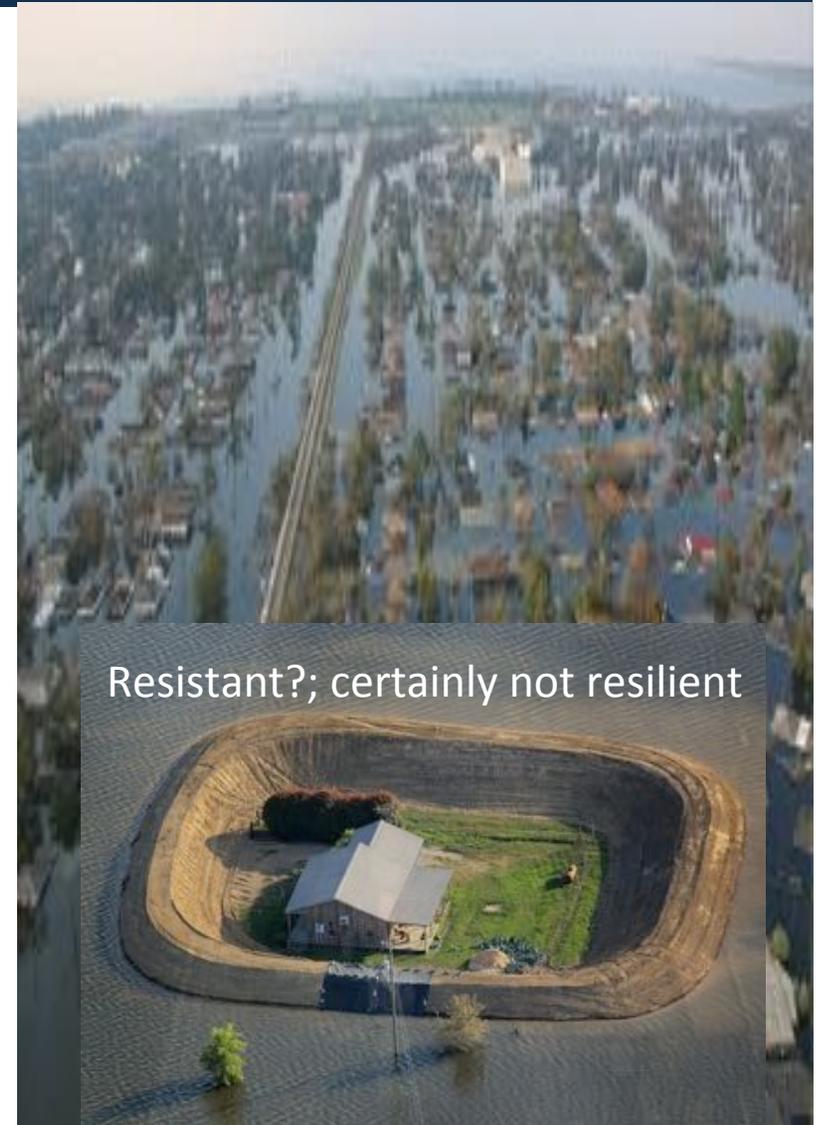
These are the building material for floodplains, most is trapped by dams or prevented from entering channels. Floodplains are not physically stable – they change dramatically in response to floods as well as to regulated flows

Operationally, this means allowing streams and rivers to periodically overtop banks and fill floodplains. Flood and bankfull stages (as determined by the US Weather Service) often seek to help prevent overbank flows

Key Challenges for Integrated Floodplain Management in the Columbia Basin

- **Establish a healthy perspective between urban areas and flooding. This is central to having an integrated floodplain management strategy**

Rethink the design of cities, businesses, and farms to accommodate periodic flooding – (e.g., 2-yr inundation is critical for aquatic communities, provides important food resources and many functions without greatly impacting adjoining land use, and represents areas most easily altered by channelization, riprap, and levees)



Urban Designs to Accommodate Flooding

Advances in Open Space | Buildings | Infrastructure



Key Challenges for Integrated Floodplain Management in the Columbia Basin

- **Overcome complex social issues (e.g., landowners, public perceptions and values), technical hurdles (e.g., engineering complexity, loss assessment, appropriate M&E) and effective coordination (seamless integration among agencies, Tribes, land owners and project sponsors)**

At the Basin scale, think and act in creative ways, improve adaptive capacity as individuals and as communities, and empower stewardship and the assumption of personal responsibility

Our Vision for Columbia River Floodplains

It is time to move beyond isolated management and restoration actions to a Basin-scale strategy. A strategy with broadly integrated actions based on a landscape perspective – one that seamlessly links social and ecological considerations

Implementing such a perspective with its attendant philosophies, ethics and visions is just as important for local sustainable economies and cultures as it is for fish, biodiversity, and healthy floodplains



Thank You!

Photo: Wallick et al. 2013

*Our Presentation Greatly Benefitted from the Professional
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