Reuse and Other Disposal Alternatives to Address Phosphorous and Temperature TMDLs for Ashland, OR

Idaho Reuse Conference

May 26, 2011

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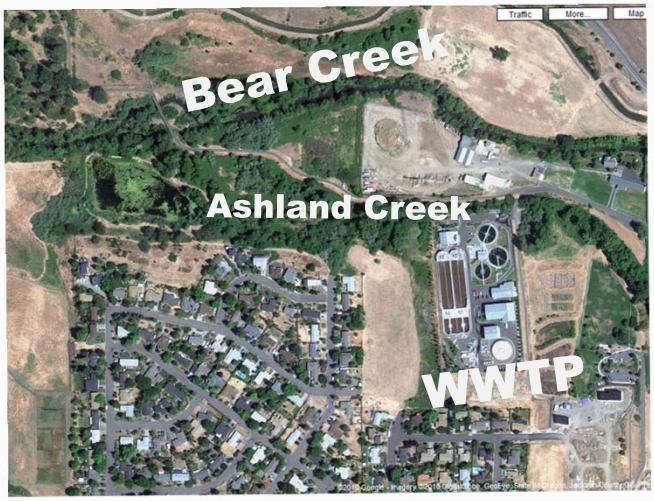
The Freshwater Trust

Case Study: Ashland

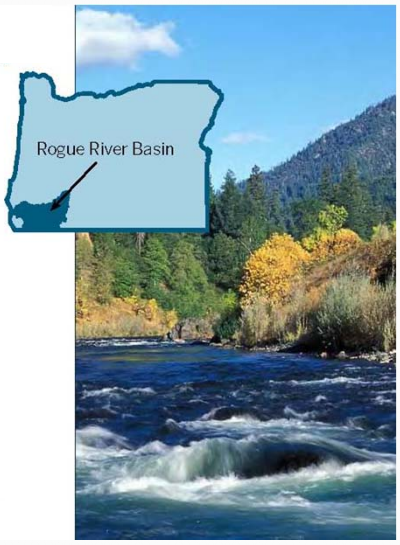
- Located SW Oregon
- Population 21,800
- Discharge to Ashland Creek
- Existing treatment process – headworks, oxidation ditch, clarification, UV disinfection, tertiary membrane filtration



2

Wastewater Treatment Requirements

- Regulatory Requirements
  - 1992 Bear Creek Total Maximum Daily Loads (TMDLs) – phosphorus, ammonia, chlorine
  - 2007 Bear Creek TMDLs – temperature, bacteria, and sediment
  - Oregon Administrative Rule 340-045-0053 – address thermal plume or "near field" concerns
- Ashland NPDES Permit



3

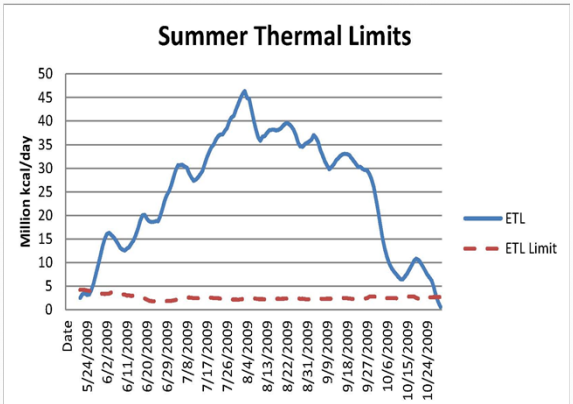
Phosphorous Removal

- Ashland NPDES permit for Phosphorous
  - Load based, from May to November (1.6 ppd)
  - Eventual concentration limit is less than 0.05 mg/L
- Options Evaluated in 1990s
  - Reuse – City purchased 800+ acres, completed design. Reuse was to include effluent disposal on City land.
  - Membranes – Because of public opposition, City abandoned reuse plan and opted to for more costly alternative to treat with alum addition and tertiary membrane filters.

4

Temperature Concerns
(Far Field)

- Bear Creek Temperature Criteria
  - Spawning period (October 15 to May 15) = 13C
  - Non-spawning period = 18C
  - Human use allowance (HUA) of 0.1C increase (weekly average), even during 10 year low flow
- Ashland Load Allocation
  - Low creek flows = extremely low HUA



5

Temperature Concerns
(Near Field)

- Local thermal plumes
  - Migration barriers
  - Thermal shock
  - Spawning impairment

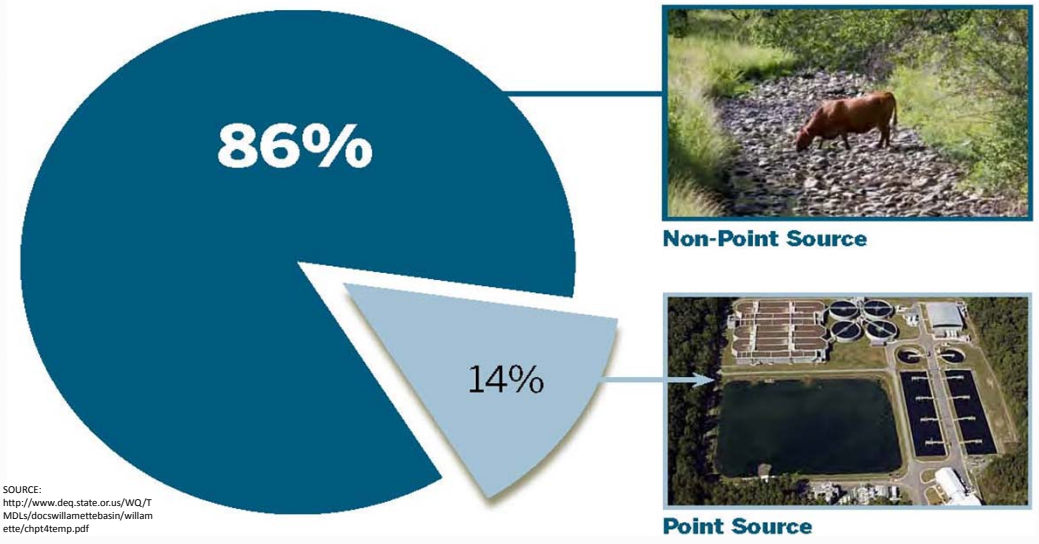
6

Temperature Reduction Options Considered

- Trading (shading)
- Discharge to nearby Talent Irrigation District
- Blending / flow augmentation
- Hyporheic discharge (shallow groundwater)
- Cooling tower / chiller
- Reuse – full and partial

7

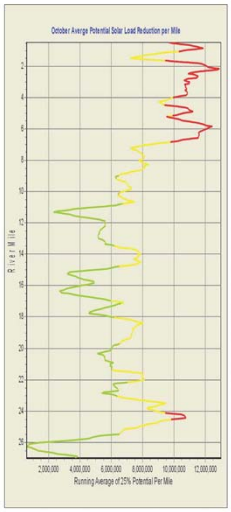
Sources of Pollution



SOURCE: http://www.deq.state.or.us/WQ/TMDLs/docswillamettebasin/willamette/chpt4temp.pdf

Trading (Shading)

- What is trading?
  Nonpoint source investment to offset a point source pollution
- What is eligible for temperature trading?
  - Shading, wetlands, flood plain restoration, restoration of cold water refugia
- Location
  - Upstream of point of max impact
  - Not all river sections are created equal
- Strong Oregon DEQ support



9

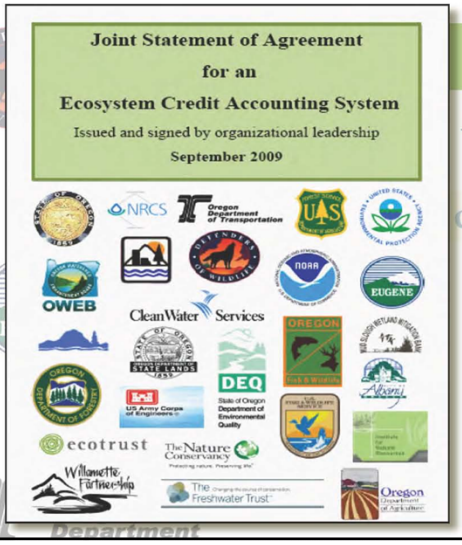
Trading (Shading) Continued

- Offset 53 million kcal/day by planting
- 8+ miles along Bear Creek
- Relocate outfall to Bear Creek, small constructed wetlands (addresses near field inputs)
- Benefits – natural approach to achieve compliance, provides other ecological benefits
- Drawbacks – more uncertainty than cooling, potential minor additional local cooling in future
- NPV = $2.9M

Bear Creek Heat Source Analysis Results				
Kcal Potential Category	Average of 25% Potential per mile (kcal/day)	# Miles by Potential Category	% Miles by Potential Category	Deliverable Solar Load Reductions Kcal/day (TOTAL)
LOW	3,257,325	5.16	19%	16,807,767
MID	6,818,842	16.65	61%	113,533,736
HIGH	10,141,007	5.34	20%	54,152,977
TOTALS	6,795,378 (weighted average)	27.15	100%	184,494,510

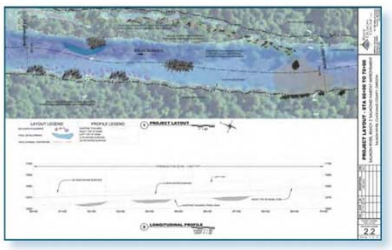
10

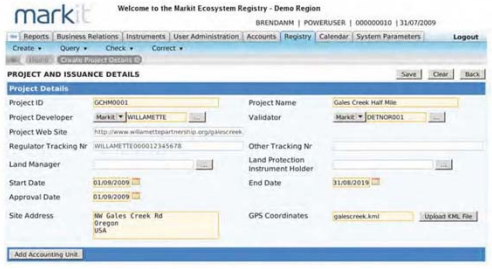
Creating Trading Protocols in Oregon



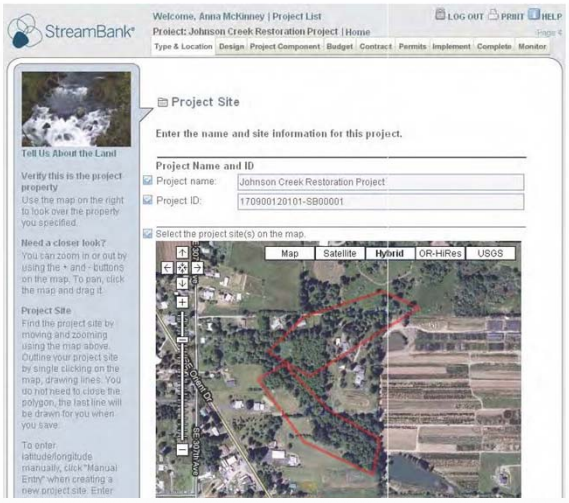
Crediting protocol approved for use

Verification & Registration



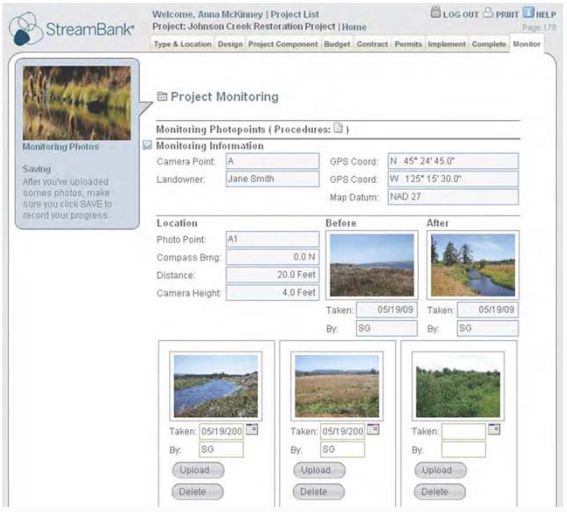


Restoration Simplified



- Automates highly repetitive steps.
- Embeds regulator-approved criteria.
- Accelerates project implementation (think Turbo Tax).
- Applies a science-based prioritization system to ensure maximum ecological benefit.

Monitoring



- Projects have baseline data and are monitored annually.
- Monitoring data is collected and stored by StreamBank, providing a searchable/reportable database of project results that can also be ported to other databases.

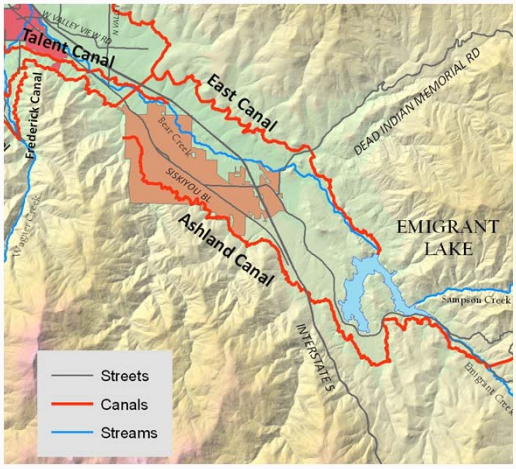
Northwest Environmental Markets Initiative

"If we ever build another chiller in Oregon at the expense of ecosystems, we've failed."

Dick Pedersen, Director
Oregon Department of Environmental Quality

Discharge to Talent Irrigation District

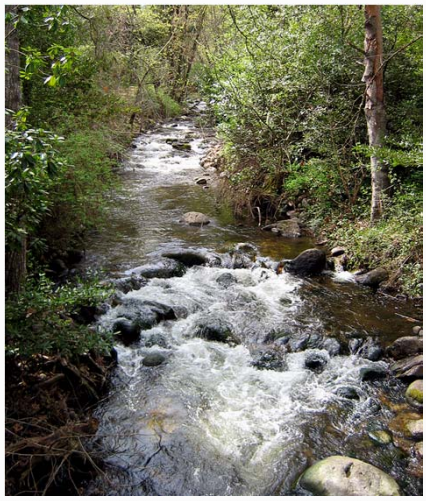
- Too many real and perceived obstacles
  - Chemicals / organic farmers
  - Public acceptance
  - Less flow available in streams
  - Shoulder season operations and maintenance
- Additional cooling improvements still required



16

Blending / Flow Augmentation

- Precedent in Oregon for this option
- Temperature data gathered shows that this was not a viable solution during hot summer periods
- Concerns about quality of water source



17

Hyporheic
(Shallow Groundwater)

- Review of soil data suggests that this will be land intensive
- Availability of suitable soils is questionable
- Significant additional effort required to determine if feasible

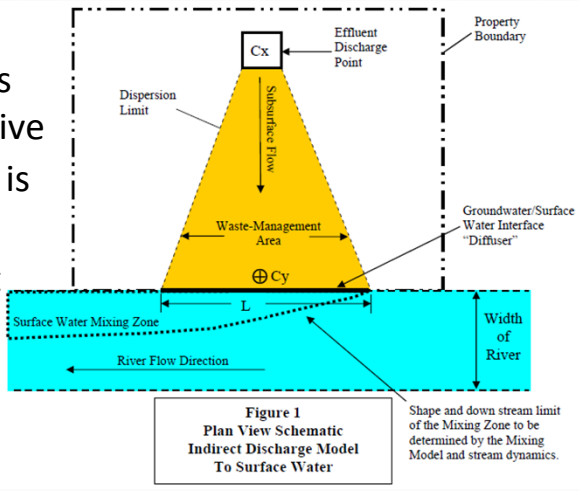
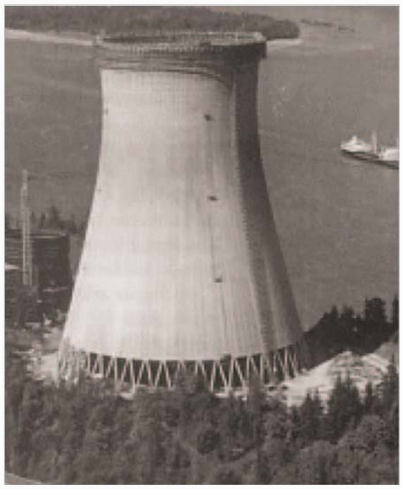


Figure 1
Plan View Schematic
Indirect Discharge Model
To Surface Water

18

Cooling Tower / Chiller

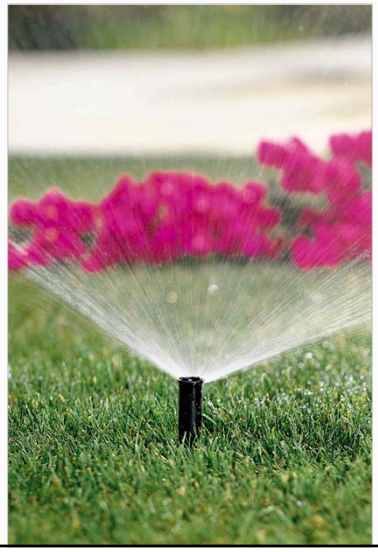
- Cooling tower alone not sufficient – Chiller required
- Pre- and post-cooling storage required
- Benefits – Compliance can be achieved quickly and with certainty; eliminates “near field” temperature concerns
- Drawbacks – Expensive, high O&M costs, not very “green”
- NPV = $8.6M - $11.6M



19

Reuse

- Irrigate 433+ acres
- Large storage volume required to address shoulder season compliance
- Benefits — property water rights can be transferred, lower O&M costs, Class A and B reuse can be phased into community over time
- Drawbacks — Water is removed from Ashland / Bear Creeks, highest cost option
- NPV = $10.1 M



Reuse Continued

- Partial reuse to offset existing property water right
- Benefits – Lower capital cost, water rights can be transferred, some discharge can remain in creeks during critical periods
- Drawbacks – Higher O&M, additional cooling options required
- NPV = $5.8M – $9.4M

21

Ashland: Summary of Recommendations

- Includes a combination of improvements
- Trading – shading 8+ miles to offset the temperature load
- Wetlands / Hyporeic – minor local cooling to address minor fish migration barrier (1C)
- Partial Reuse – part of long-term solution to address water supply concerns. City's high-quality effluent will facilitate eventual Class B and Class A uses

22

Questions?