

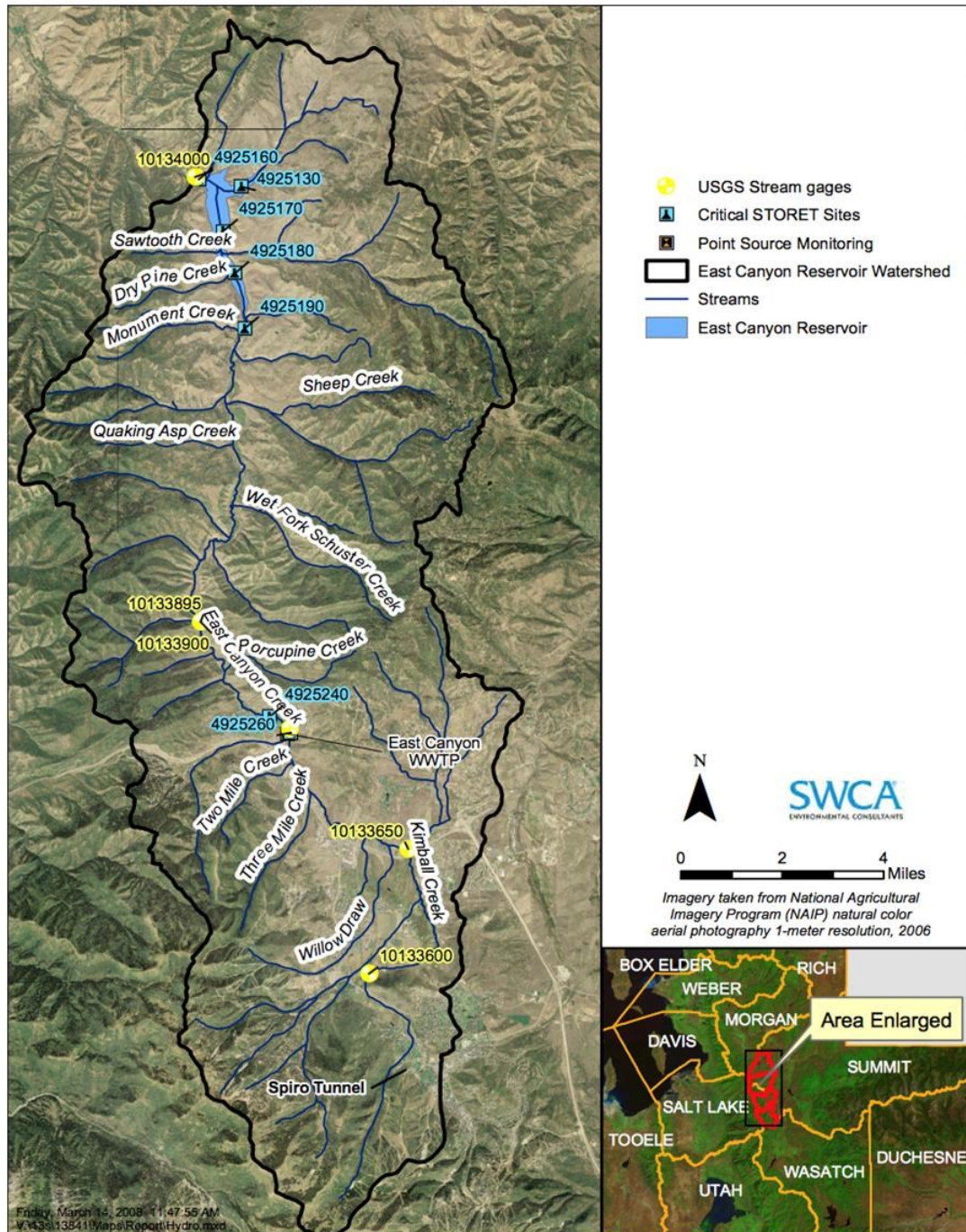


Water Reuse and In-Stream Flow Limitations for the Snyderville Basin Water Reclamation District

WSWC WQ2 Workshop

Walt Baker, Utah Division of Water Quality

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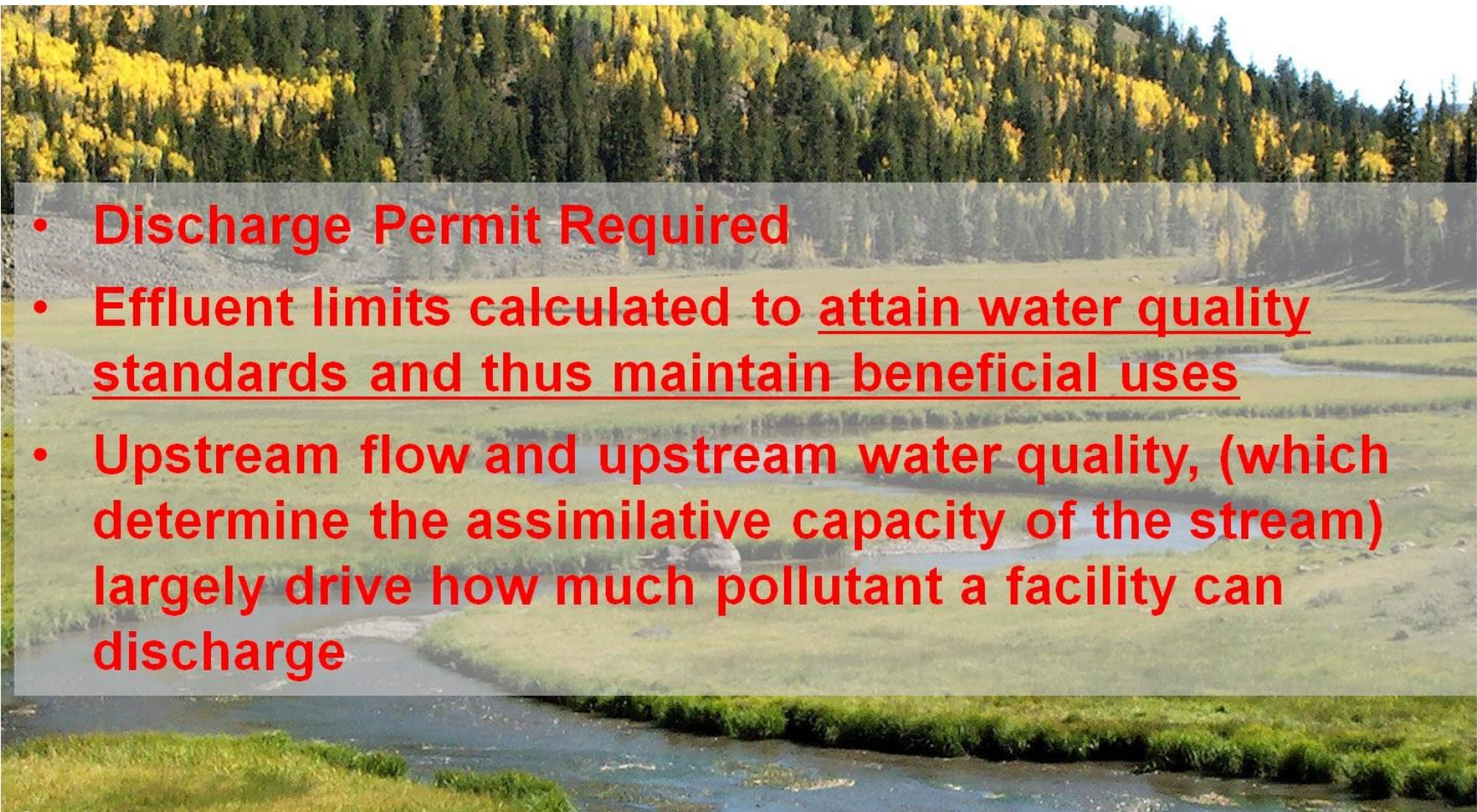


East Canyon Watershed

Receiving Water: East Canyon Creek



Discharges to Waters of the State

- 
- **Discharge Permit Required**
 - **Effluent limits calculated to attain water quality standards and thus maintain beneficial uses**
 - **Upstream flow and upstream water quality, (which determine the assimilative capacity of the stream) largely drive how much pollutant a facility can discharge**

Coat Impact of an NPDES Permit

- Cost of treatment is largely determined by the effluent limits imposed on a POTW
- Effluent limits
 - ✓ Utah Secondary Standards (minimum)
 - ✓ Water quality-based standards
- Q of effluent vis-à-vis Q of the receiving stream largely determines a POTW's effluent limits

Water Quality Standards

Utah Secondary

BOD – 25 mg/l

TSS – 25 mg/l

E-coli – 126/100ml

pH – 6.5 to 9.0

Water Quality-Based

Chlorine

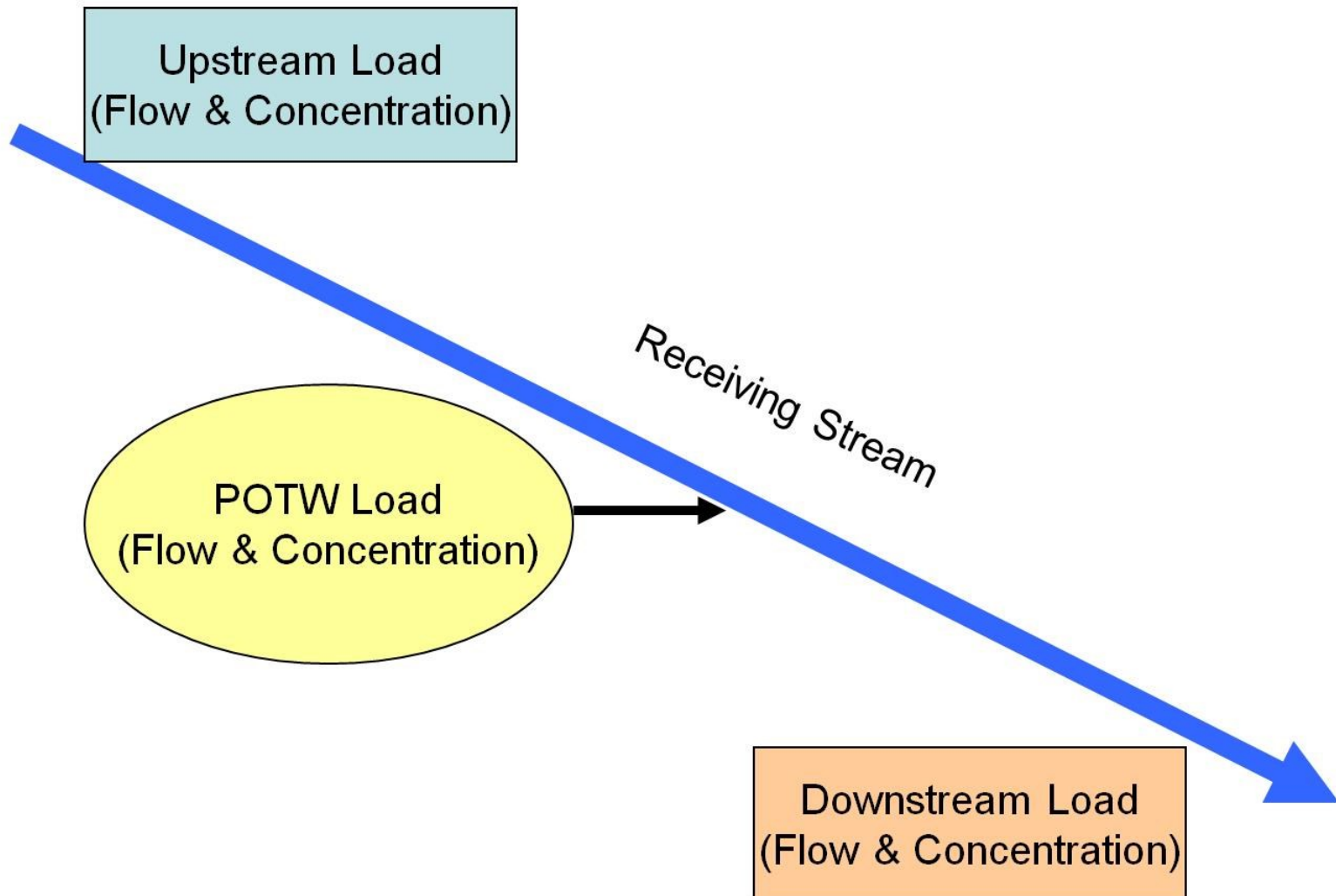
Ammonia

Phosphorus

Dissolved Oxygen

Metals

Generic Discharge Scenario



How is an Effluent Limit Derived?

Mixing Calculation:

$$(F1 \times C1) + (F2 \times C2) = F3 \times C3$$

◆ Upstream (F1 & C1)

- ◆ F1 = Flow (7Q10; 7-day, 10-year low flow)

- ◆ C1 = Pollutant concentration

◆ POTW (F2 & C2)

- ◆ Flow

- ◆ Pollutant Limit

◆ Downstream (F3 & C3)

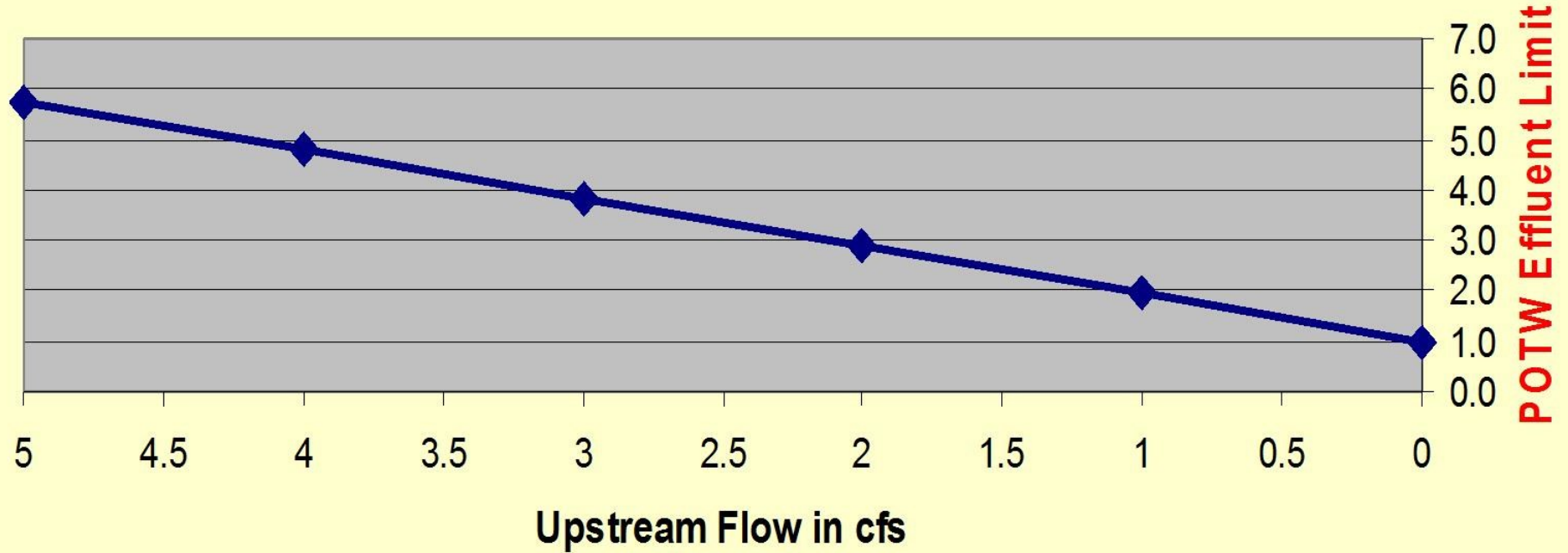
- ◆ F3 = Flow

- ◆ C3 = Pollutant WQ Standard

POTW Generic Example

Upstream Flow	Upstream Concentration	POTW Discharge Flow	POTW Effluent Limit	Downstream Flow (F1 +F2)	Water Quality Standard Needed
F1	C1	F2	C2	F3	C3
5	0.05	1	5.8	6	1
4	0.05	1	4.8	5	1
3	0.05	1	3.9	4	1
2	0.05	1	2.9	3	1
1	0.05	1	2.0	2	1
0	0	1	1.0	1	1

Flow Impact on Effluent Limit



Flow verses Concentration (mg/l)

Example: East Canyon Creek

- ***Snyderville Basin Water Reclamation District*** (Park City, Utah)

Situation:

- 1. East Canyon Creek – Excessive Nutrients leading to Low Diss. Oxygen**
- 2. Critical Season – July through Sept.**
- 3. Explosive Growth – increased demands for water and decreased stream flows**
- 4. Currently employing chemical phosphorus treatment**

East Canyon Creek: High Nutrients – algae – low Dissolved Oxygen



Cost of Phosphorus Removal



Snyderville Basin East Canyon POTW

Upstream Flow (cfs)	Upstream Phos. Concentration (mg/l)	POTW Discharge Flow (cfs)	POTW Phos. Effluent Limit (mg/l)	Downstream Flow (F1 +F2) (cfs)	Water Quality Standard Needed (Phos. mg/l)
F1	C1	F2	C2	F3	C3
17	0.03	6.2	0.105	23.2	0.05
13	0.03	6.2	0.092	19.2	0.05
9	0.03	6.2	0.079	15.2	0.05
5	0.03	6.2	0.066	11.2	0.05
1	0.03	6.2	0.053	7.2	0.05
0	0	6.2	0.050	6.2	0.05



7Q10 of East Canyon Creek = 0 cfs

Implications

- **Multi-million \$\$ plants are designed to meet certain effluent limits**
- **Effluent limits are subject to flow changes (7Q10):
lower flows \Rightarrow different effluent limits
 \Rightarrow a different treatment technology**
- **Time-frame for planning, designing and constructing a treatment plant takes years.
Designs are typically for 20 years into the future**
- **Cost to the public is significant
Phosphorus removal: \$3.6 million
Annual chemical costs: \$250,000**



Problem Solution?

Obtain instream flows

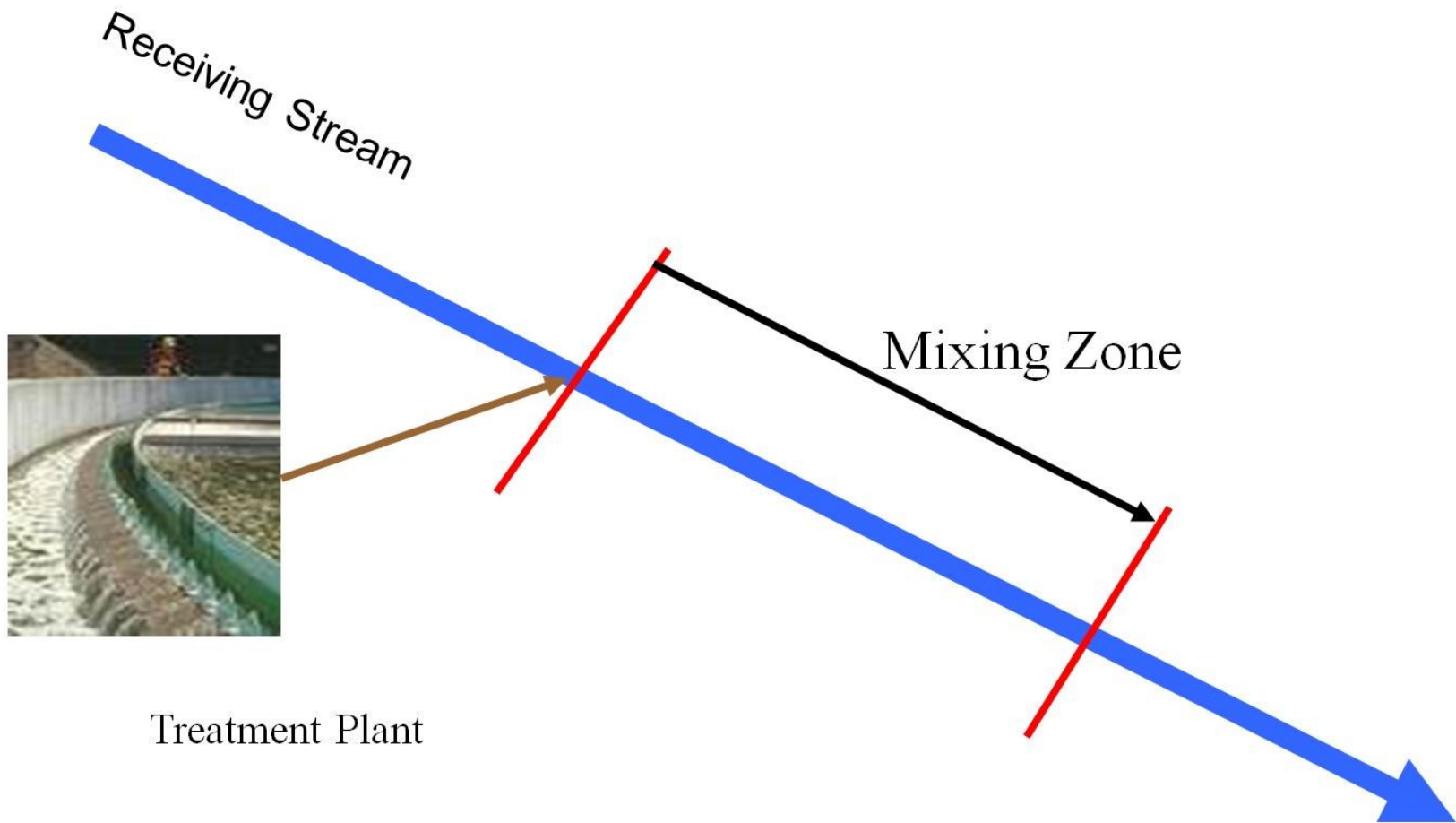
Why Does Existing Statute Not Address This Problem?

- Only Wildlife Resources & State Parks and Recreation can hold water right for instream flows and their application of this has historically been very narrow
- If there is no fishery or recreational interest, then there may be no incentive to grant an instream flow right
- Monitoring and enforcement by these state agencies is difficult

How Many POTWs May Benefit?

- Approximately 18 POTWs discharge to streams where an instream water right might be helpful
- Approximately 6 are owned by special service districts not municipalities
- Large & Small POTWs are candidates
 - Wellsville, Logan, Kamas, Brigham City, Ashley Valley, Hyrum, Central Valley, South Valley, St. George City, Perry City, Springville, Richmond, Salina, Provo, Snyderville Basin, Central Weber

Mixing Zone



How Far Downstream Would an Instream Right Be Needed?

- Mixing Zone below POTWs
 - Maximum of $\frac{1}{2}$ mile for chronic pollutants
 - Maximum of hundreds of feet for acute pollutants
- Downstream Users would largely not be impacted by POTWs holding instream water rights solely within the mixing zone

Option A: Water Quality

- ✓ Eligible entities: municipalities, districts, interlocal agreements
- ✓ Voluntary: eminent domain can't be exercised
- ✓ No time limitation on the water right
- ✓ DWQ must certify that the instream flow is critical to comply with a water quality standard
- ✓ Limit instream flow only through the mixing zone

Option B: Trout Unlimited

- ✓ Directed to the upper watershed
- ✓ Enhance habitat for native cut throat trout
- ✓ Eligible entity: 501(c)(3) organizations
- ✓ Sunset after 10 years
- ✓ Voluntary participation by water rights holder
- ✓ Rights may be sold, leased or donated
- ✓ Protects water rights holders who fear forfeiture

What Happened?

- The legislation failed in 2006 but TU legislation passed in 2007
- POTWs could not abide the 10-year sunset provision
- Water conservancy districts and municipalities supported the WQ legislation
- Ag interests did not support the WQ legislation and were fearful of political subdivisions possibly competing with them for the purchase of water rights thereby driving up the cost of the rights to agriculture
- In Utah messing with water rights statutes is a risky proposition