Streamlining the UAA Process

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General UAA Framework

Use exists, or water quality necessary to support the use achieved, as of 1975 or later?

Yes

No UAA

Implement TMDL if not obtaining use

No

Implement UAA to determine if use attainable

Step 1: Is the designated use being attained?

Step 2: Is water quality sufficient to attaining the beneficial use?

Step 3: What factors preclude attainment of the beneficial use?

Step 4: Is restoration feasible?

Challenges in UAA Process

- ✓ Definition often ambiguous (e.g., WARM use)
- ✓ Lack of tiered aquatic life uses results in same expectations of beneficial use in human-altered systems as in relatively natural systems.
- ✓ Human-influenced water bodies often don't have easily defined "reference" conditions with which to compare (e.g., urban or effluent-dependent waters)
- ✓ Can be complex and difficult to interpret results, especially in human-modified systems
- ✓ Often leads to lack of focus to assessment, costly studies, and lengthy process.

40 CFR Factors

(1) Naturally occurring pollutant concentrations prevent the attainment of the use.

(2) Natural, ephemeral, intermittent, or low-flow conditions or water levels prevent the attainment of the use.

(3) Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.

40 CFR Factors

(4) Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use.

(5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow depth…unrelated to water quality preclude attainment of aquatic life protection uses.

(6) Controls more stringent than those required by Sections 301(b)(1)(A) and (B) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

Step 1: Identify valued indicators and measurable attributes of the beneficial use: COLD Use

- Salmonids (trout) – any and all life stages
- Obligate cold water stonefly species (those requiring < 15°C most of the year)
- Emphasis on water quality and physical habitat characteristics necessary to support various life stages

Develop Conceptual Model : Trout Assessment Endpoint

Hydrological Factors

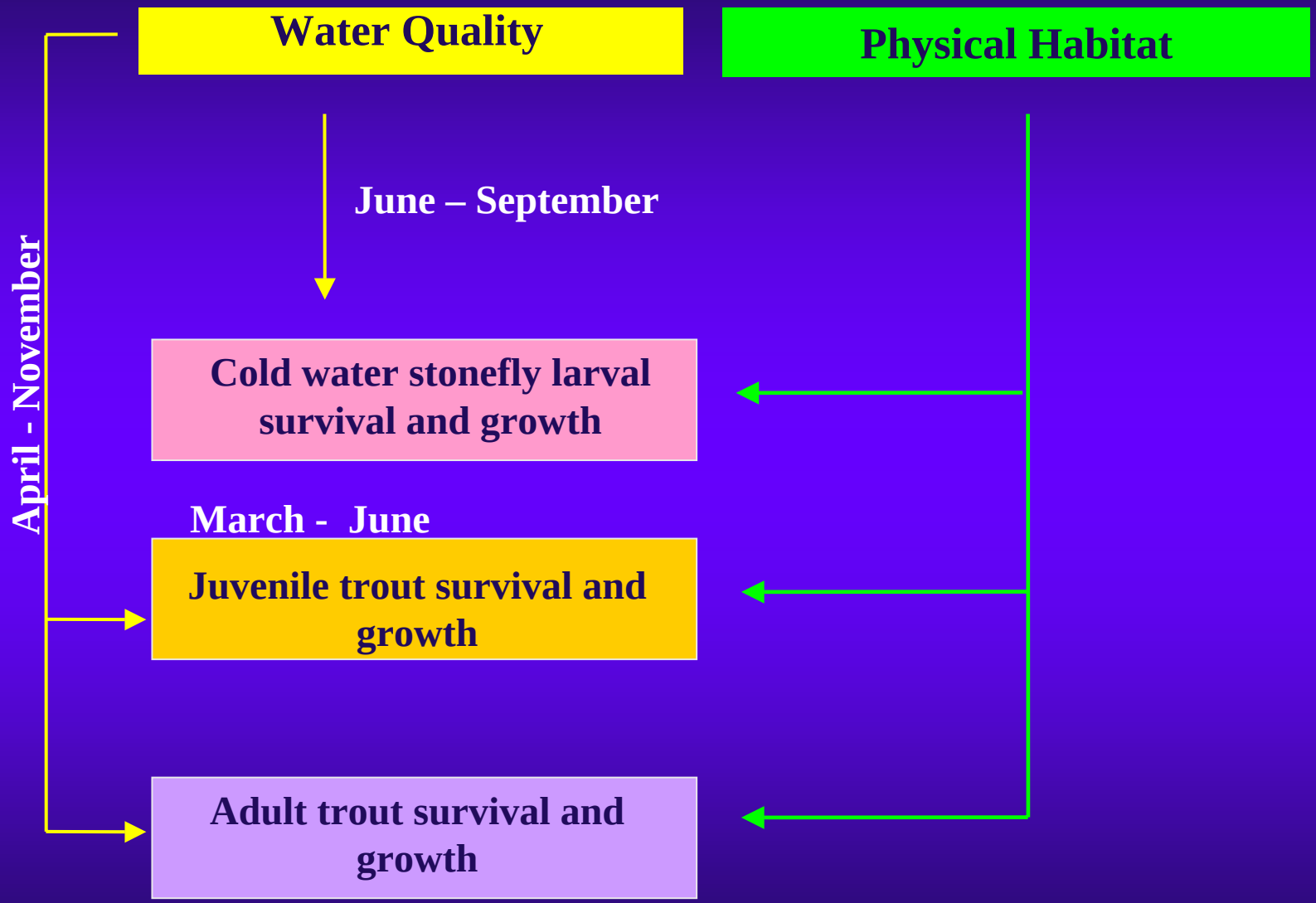
- Channel morphology
- Geology
- Upper watershed flow
- Land cover/land use

Physical Habitat

- Pool/depth/velocity
  - % pools
  - Pool class rating
  - Average water velocity
- Substrate
  - % substrate size class
  - % riffle
  - Avg. gravel size in spawning areas
  - Predominant substrate type
- Riparian
  - % pools
  - % midday shade

Water Quality

- Temperature
- Dissolved Oxygen
- pH


Water Quality
Physical Habitat
June – September
April - November
Cold water stonefly larval survival and growth
March - June
Juvenile trout survival and growth
Adult trout survival and growth

Step 2: What factors preclude attainment of the beneficial use?

- Rely on consensus-based and/or standard benchmarks for evaluating whether minimum habitat and water quality requirements are met for each assessment endpoint
- Use weight of evidence to evaluate the effects of individual parameters within multi-metric indices (e.g., HSI, RBP)

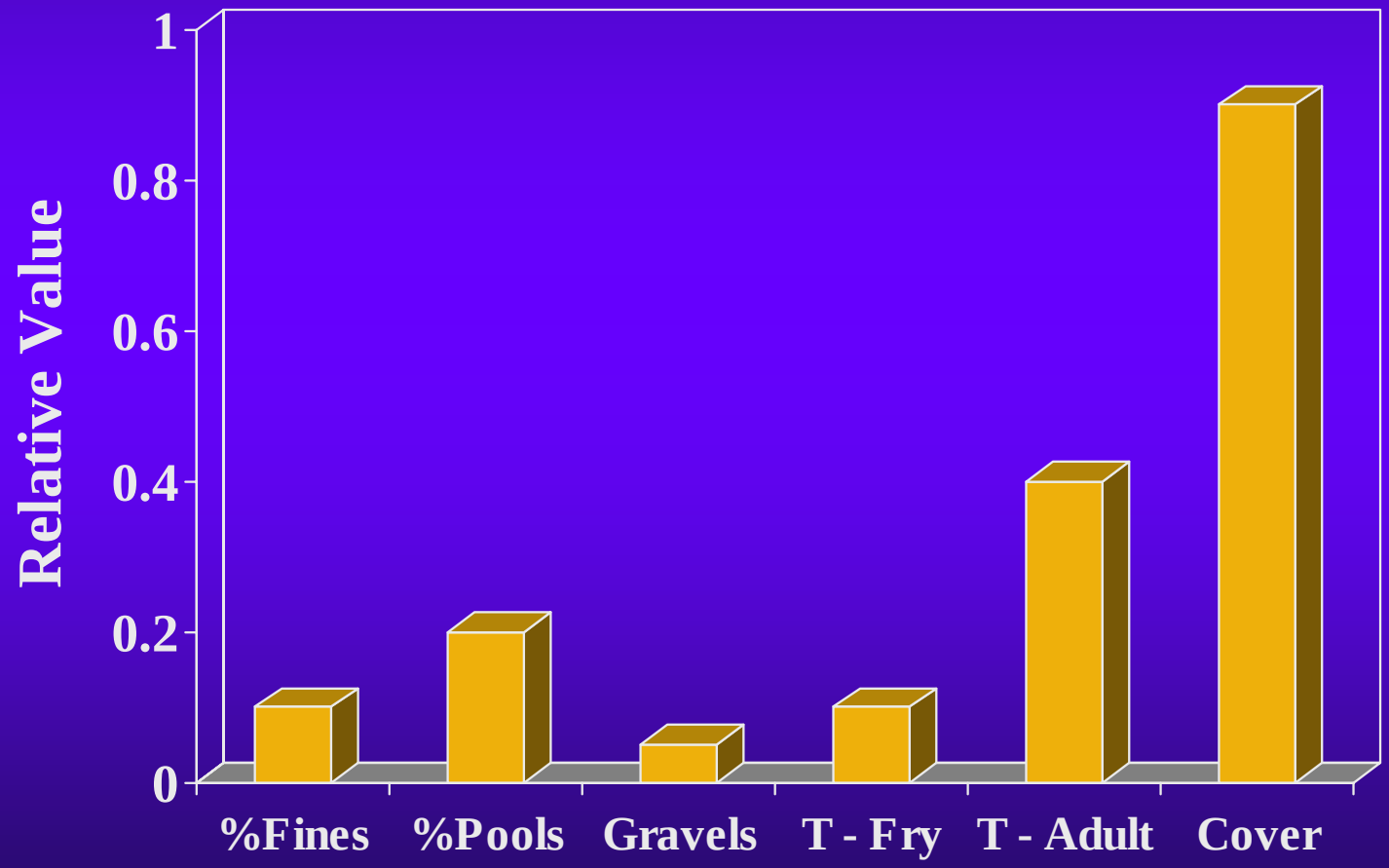
Measure of Exposure: Trout HSI criteria

Component	Variable	Minimal Habitat (SI ≥ .3)
Adult	Average thalweg depth	> 26 cm
Adult, Juvenile	% instream cover	> 2
Adult, Juv., Fry	% pools	0 – 100%
A, J	Pool class rating	A, B, or C
Fry	% substrate size class	> 3%
Fry , Other	% riffle fines	< 45%
Embryos	% riffle fines	< 18%
Embryos	Average water velocity	16-83 cm/s
Embryos	Gravel size in spawning areas	0.5-8.5 cm
Other	% streamside vegetation	> 50
Other	% midday shade	0-100%
Other	% streamside vegetation (erosion)	> 25%

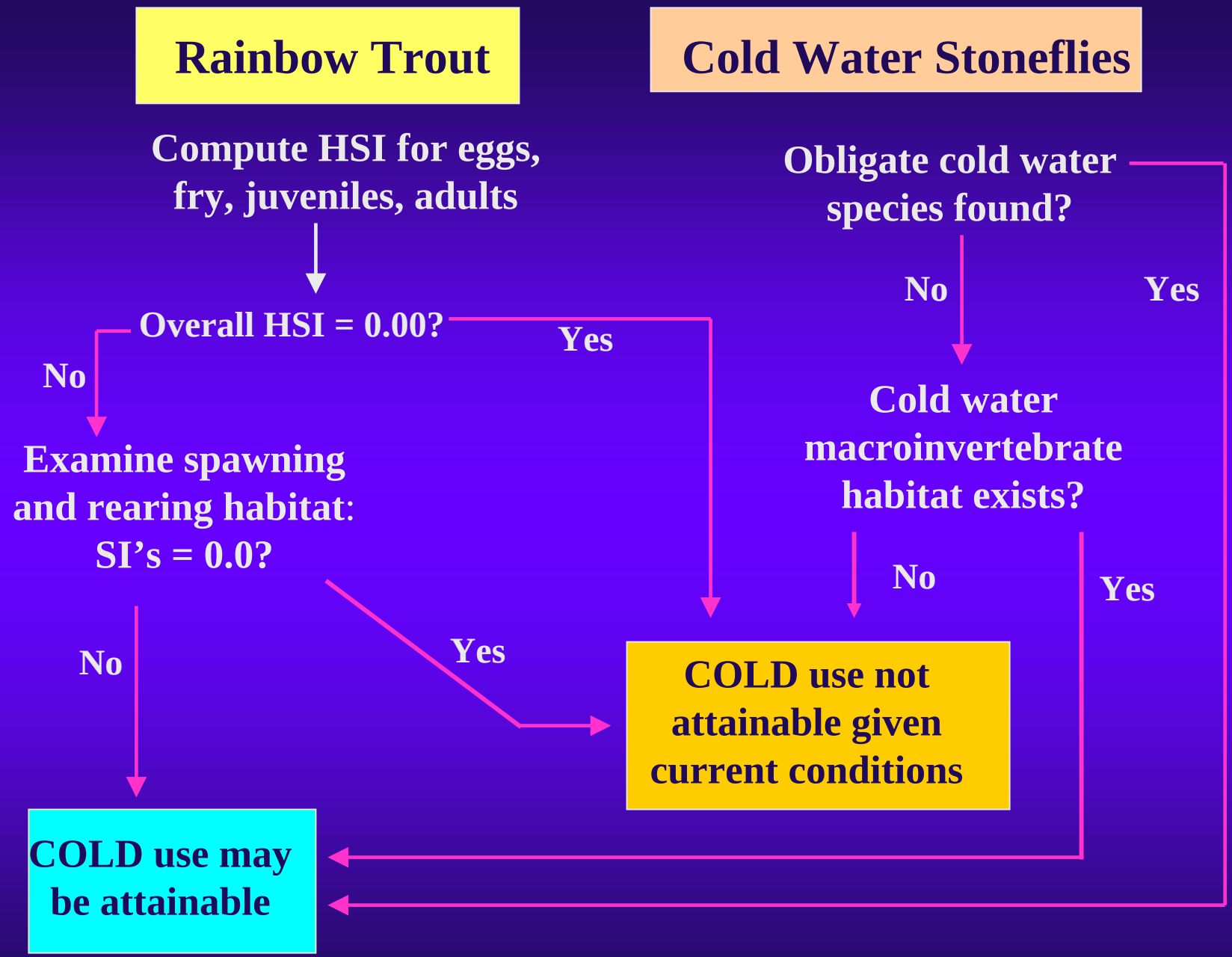
Step 2: Determine limiting 40 CFR factor(s) preventing attainability of use

- Identify measures of exposure most unsatisfactory as compared to minimum requirement criteria
- Identify measures of exposure that are likely to be unsatisfactory for an entire life stage or multiple life stages of an indicator
- EPA's Stressor Identification process can be helpful

Stream Factors in Comparison with Minimum Requirements for Trout



Use Decision Flowchart based on Conceptual Model to Determine Attainability and Limiting Factors


Rainbow Trout
Cold Water Stoneflies
Compute HSI for eggs, fry, juveniles, adults
Overall HSI = 0.00?
Yes
No
Examine spawning and rearing habitat: SI's = 0.0?
Yes
No
COLD use not attainable given current conditions
COLD use may be attainable
Obligate cold water species found?
No
Yes
Cold water macroinvertebrate habitat exists?
No
Yes

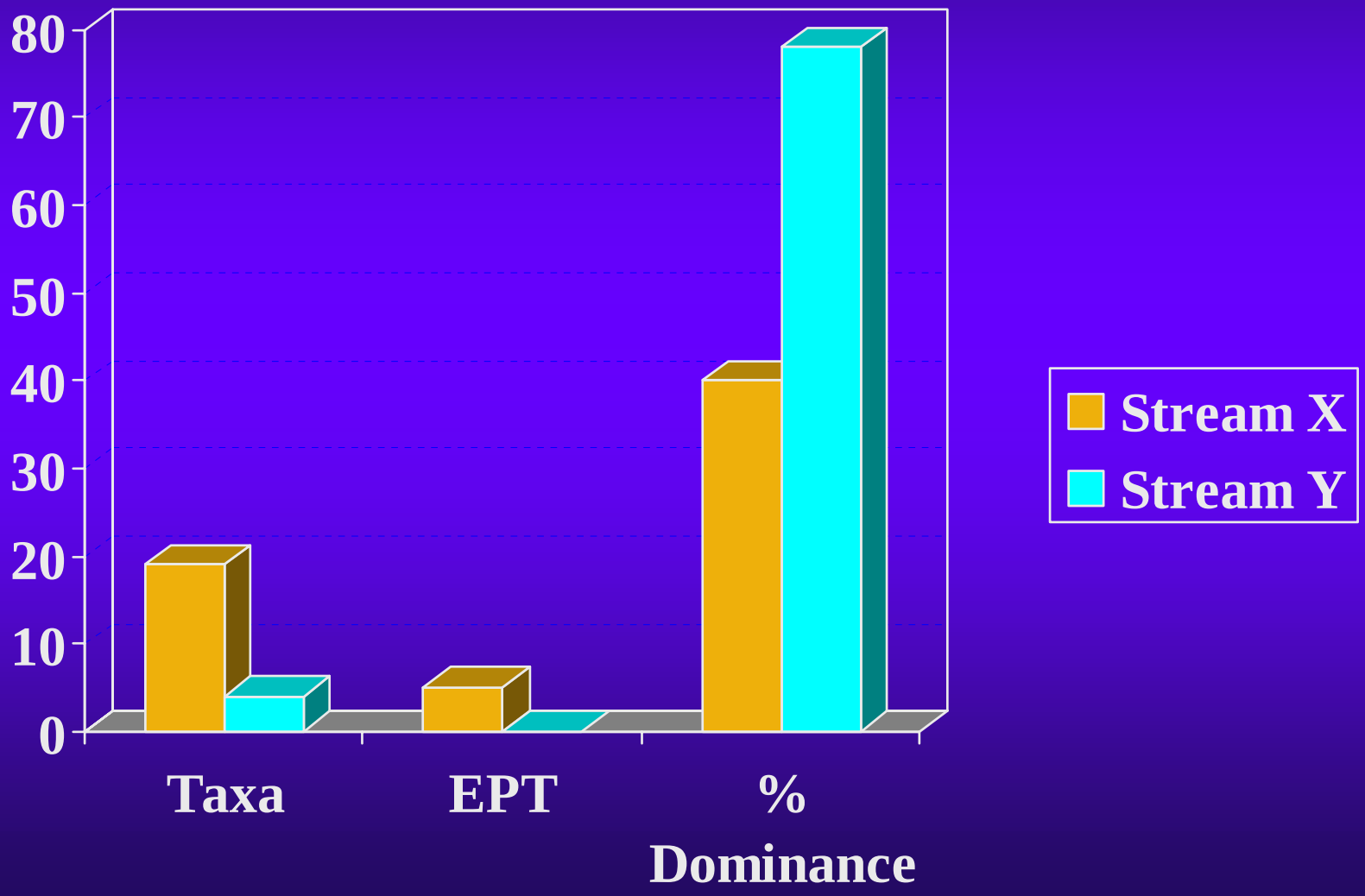
Step 3: Is restoration feasible?

- For EDWs, existing water quality limitations are generally considered to be restorable (i.e., effluent is treatable)
- Physical factors such as temperature may be limited by ultimate factors not easily restorable (e.g., elevation, climate)
- Hydrologic modification may or may not be restorable; if natural physical factors also limiting, then restoring satisfactory hydrologic conditions may be of little benefit.

What happens when you don't have clear indicators of the Use?

- ANY and all indications of the beneficial use are plausible – minimal indications of the use are equivalent to optimal indications; degraded yet restorable systems are not recognized.

For both streams, WARM use exists and is being attained.



California's WARM USE

- With no clear use indicators or TALU, conceptual model depends on collecting ANY warm water aquatic life.

- Without clear expectations based on a BCG, very different types of systems may be treated similarly

Stream Y

Stream X