

**BROAD CATEGORIZATION OF ELEMENTS
UNDER THE FOUR H'S
DRAFT 1/26/99 DRAFT**

Policy-Related

- Performance Standards
- Research, Monitoring, and Evaluation
- Crediting
- Prioritization (trade-offs, relative cost-effectiveness, biological significance, etc.)
- Leveraging (economic, legislative, policy, political)
- Comprehensive Management (human management decisions relative to natural conditions; e.g., hydrologic conditions, ocean conditions)
- Consistency with ESA goals
- Purchases/leases/buy-outs (habitat, fisheries, water)
- Relative benefit of continued focus on hydro relative to opportunities in other 3 H's (not an issue if legitimate consideration of priorities, cost-effectiveness, etc.)

Hydro

System Operational and Reservoir Improvements (including “normative river” concepts)

- Flow augmentation
- Gas management
- Northern pike-minnow management
- Restoration of substrate
- Power peaking/ramp rates
- In-river structure
- Enhance food web
- Sediment transfer

Project Operational Improvements

- Turbine operations/priority
- Spill

Project Structural Improvements

- Mechanical bypass
- Surface collection
- “Fish friendly” turbines
- Spillway structures
- Adult facilities

Habitat

“Protection” from Further Perturbations

- Stream-side buffers
- Reduced point-source pollution
- Reduced dredging in “sensitive” areas

- Reduced water withdrawals

Small Dam Removal

Estuarine Improvements

- Manage dredge spoils to reduce avian predation
- Enhance food web (nutrient loading)

Ocean Improvements

Tributary Improvements

- Case studies (e.g., Umatilla River)
- Enhance food web (nutrient loading, burning, etc.)
- Riparian improvements
- Riffle/pool rebuilding
- Enhance stream structure
- Instream flow
- Restoration of substrate

Hatcheries

Management Objectives

- Production primarily for harvest
- Use for overall basin production goals (“supplementation”)
- Genetic preservation

Adult Production Objectives (quality and quantity)

- Incentive for adult production
- Grading
- Release timing
- Volitional releases

Uniform Standards

- Standardized practices (IHOT)
- “NATURES” concept

Harvest

Escapement-Based Harvest Management

- Harvest schedules consistent with rebuilding goals
- Harvest reductions for near-term “jump start” (e.g., Columbia River pass-thru)

Selective Fisheries

- Larger gill nets
- Merwin trap or other live capture gear types
- Terminal fisheries

Non-Salmonid Fisheries Management (relative to salmonid impact)

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