



NOAA Fisheries



National Marine Fisheries Service

Restoring Riparian Forests on DNR-HCP lands: What is RDFC good for?

May 25, 2005

Matt Longenbaugh

NOAA Fisheries

Lacey, WA

DNR-HCP is conservative

- Of all the forestry HCPs, the DNR HCP is most protective: site-specific management.
- Other forestry HCPs allow slightly more timber harvest in some RMZs.
- Compliance & Effectiveness Monitoring.
- Validation Monitoring to test management assumptions.
- Only DNR aims to restore Fully Functional Forests.

Current Stand Development Stages

- 32% riparian areas less than 40 yrs.
- 57% between 40 and 80 yrs. Young stage.
- 11% of riparian stands older than 80 yrs and beginning to differentiate into multi-story canopies, but still deficient in DWD and snags. Mature stage.
- Very small % now at Fully Functional stage, i.e., old-growth.

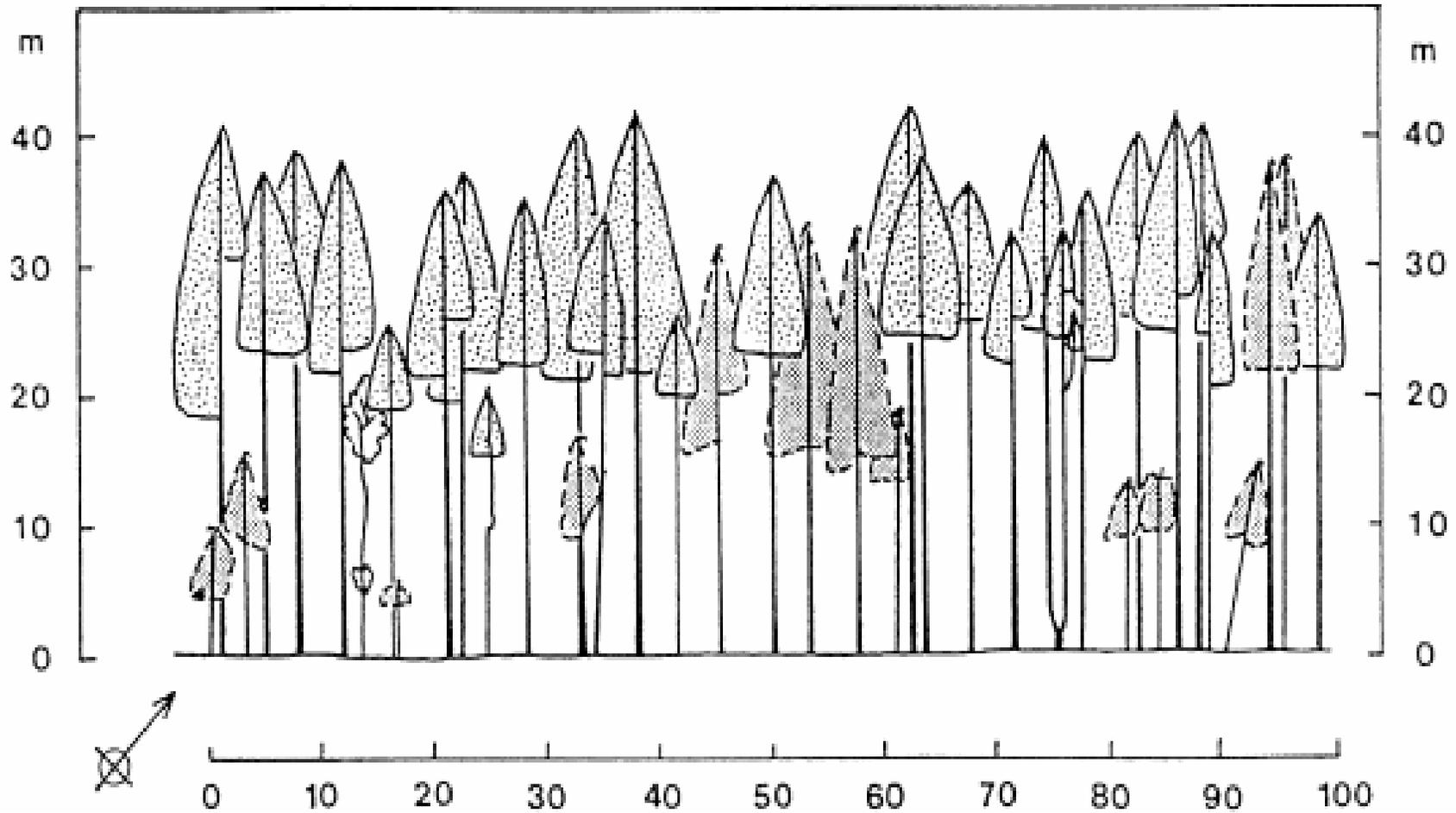


← **Approx 40-yr stand that is structurally simple and has little understory.**

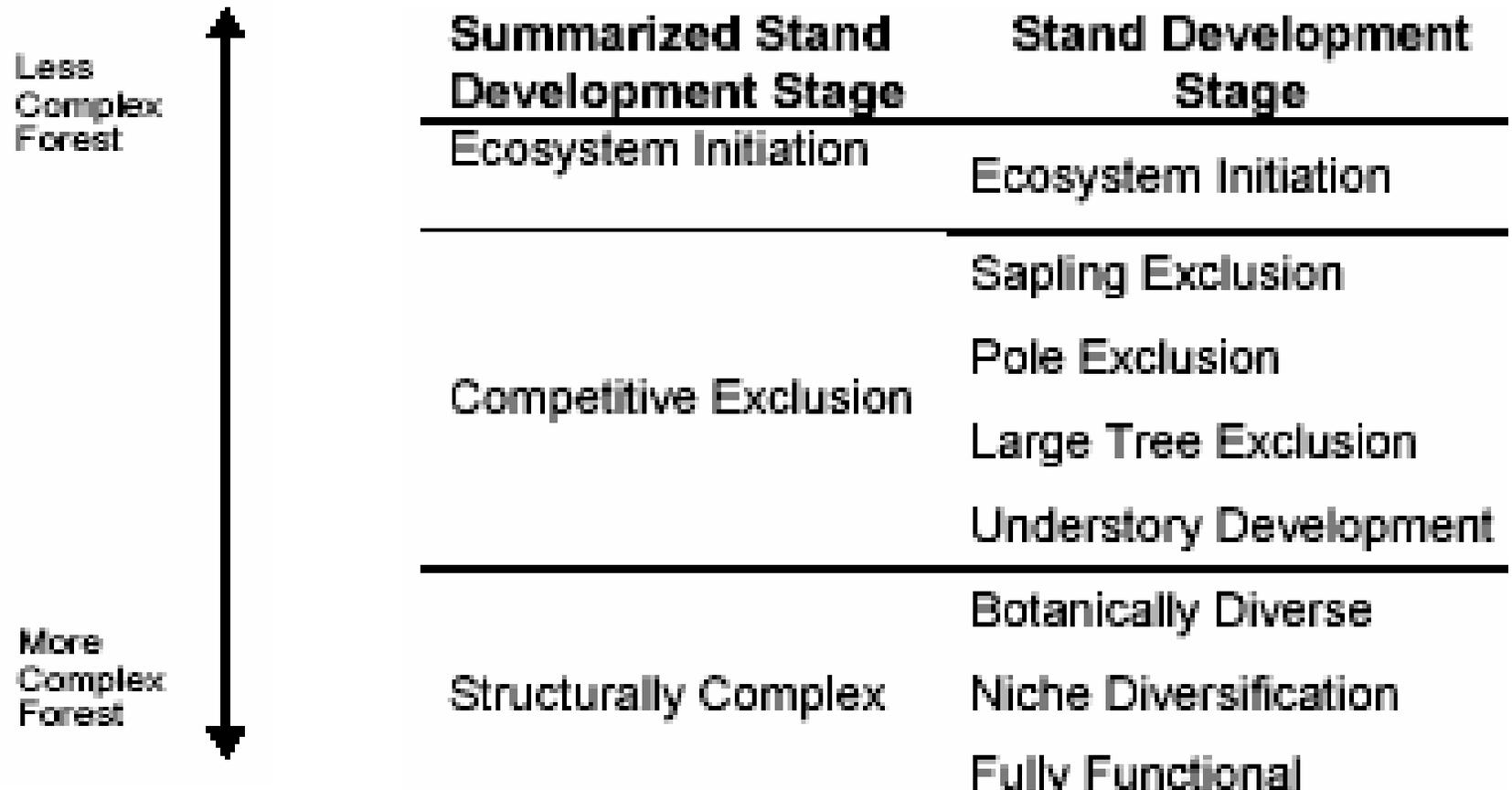
Structurally complex stand; diversifying →



55-yr Doug-fir stand



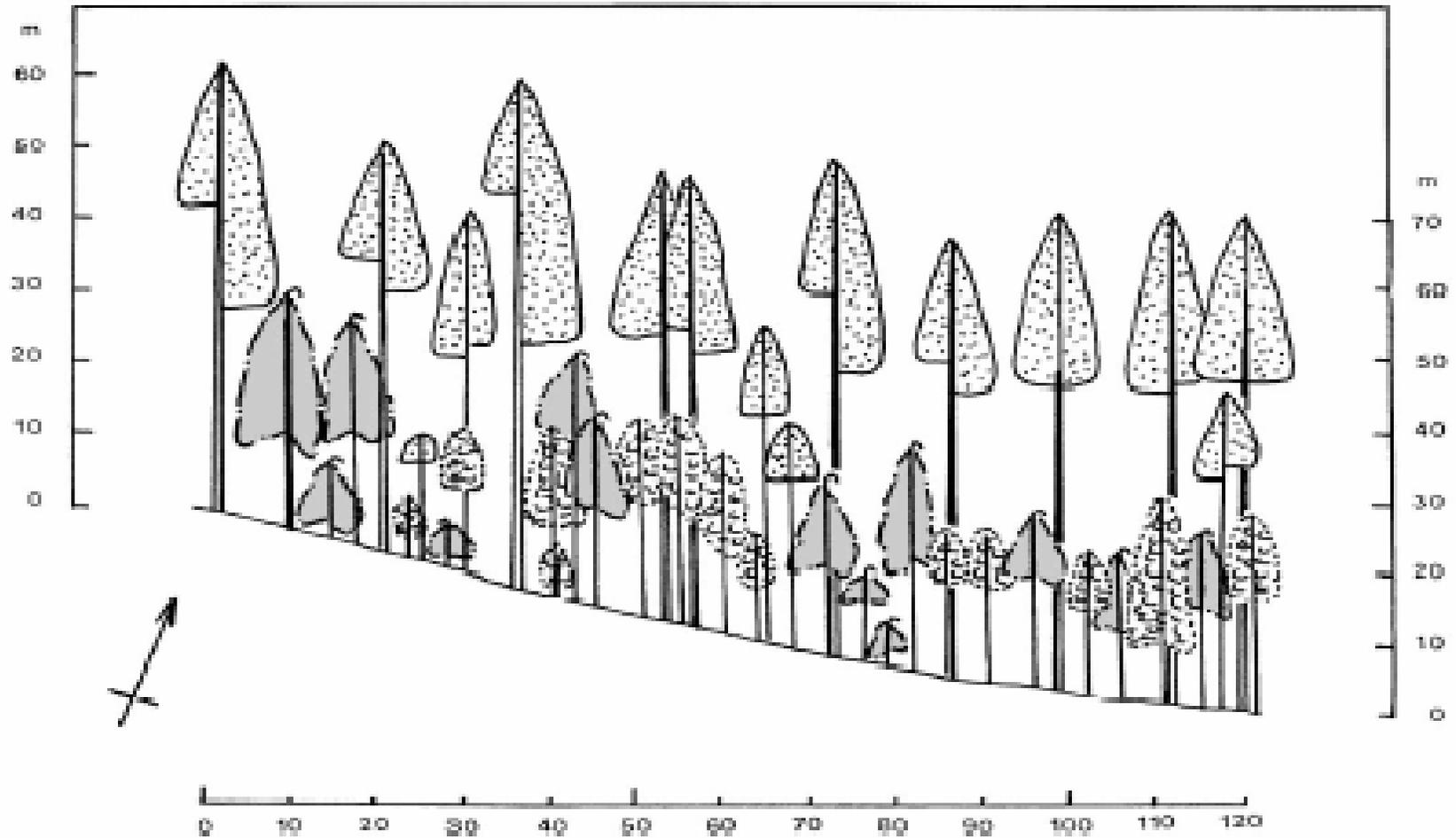
Stand Development Stages



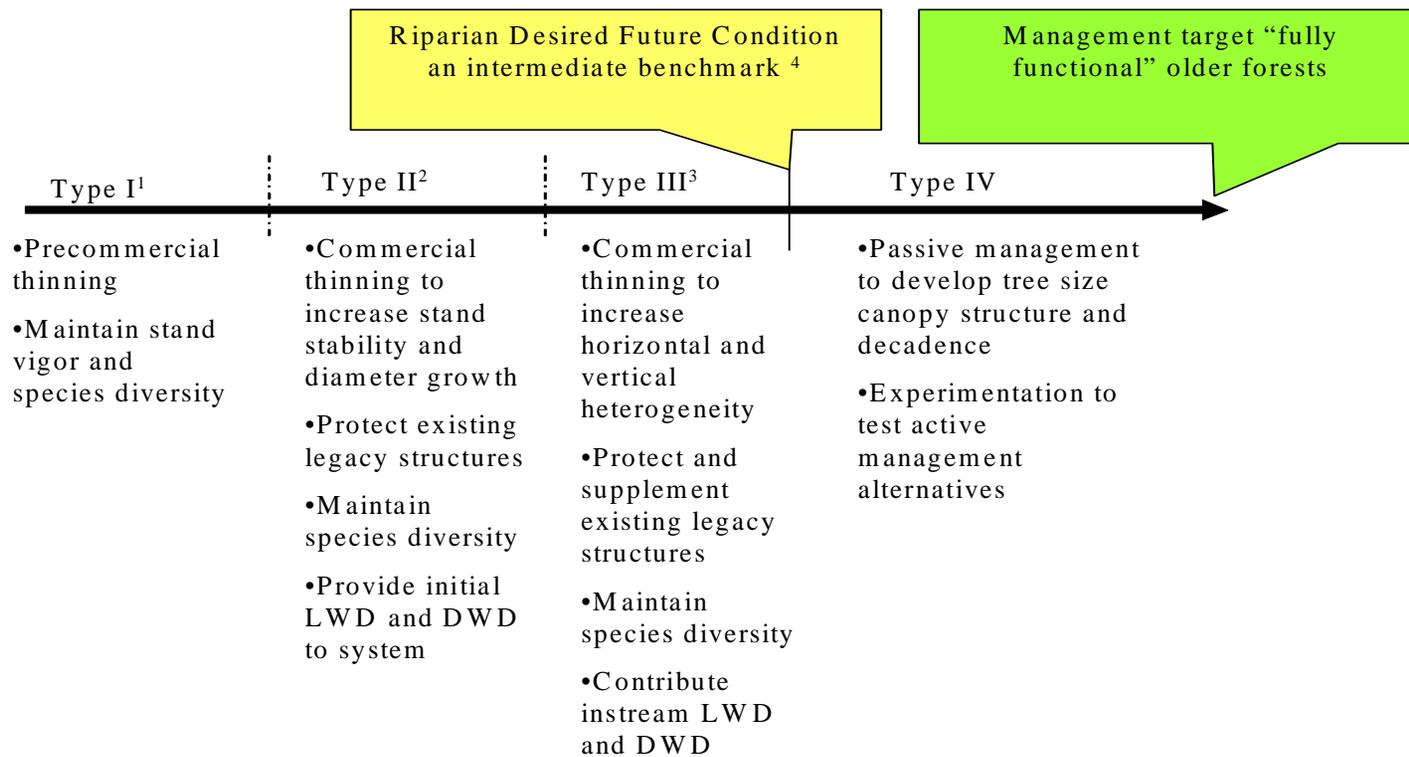
Riparian Desired Future Condition

- Basal area ≥ 300 ft²/acre
- Quadratic mean diam ≥ 21 inches
- Snags: retain all existing ≥ 20 " dbh, 3/ac.
- DWD: maintain $\geq 2,400$ cubic ft/acre
- Vertical stand structure: 2+ canopy layers.
Diam distribution reverse J -shaped.
- Species diversity: maintain at least 2 canopy tree species suited to the site.

177-yr Doug-fir stand



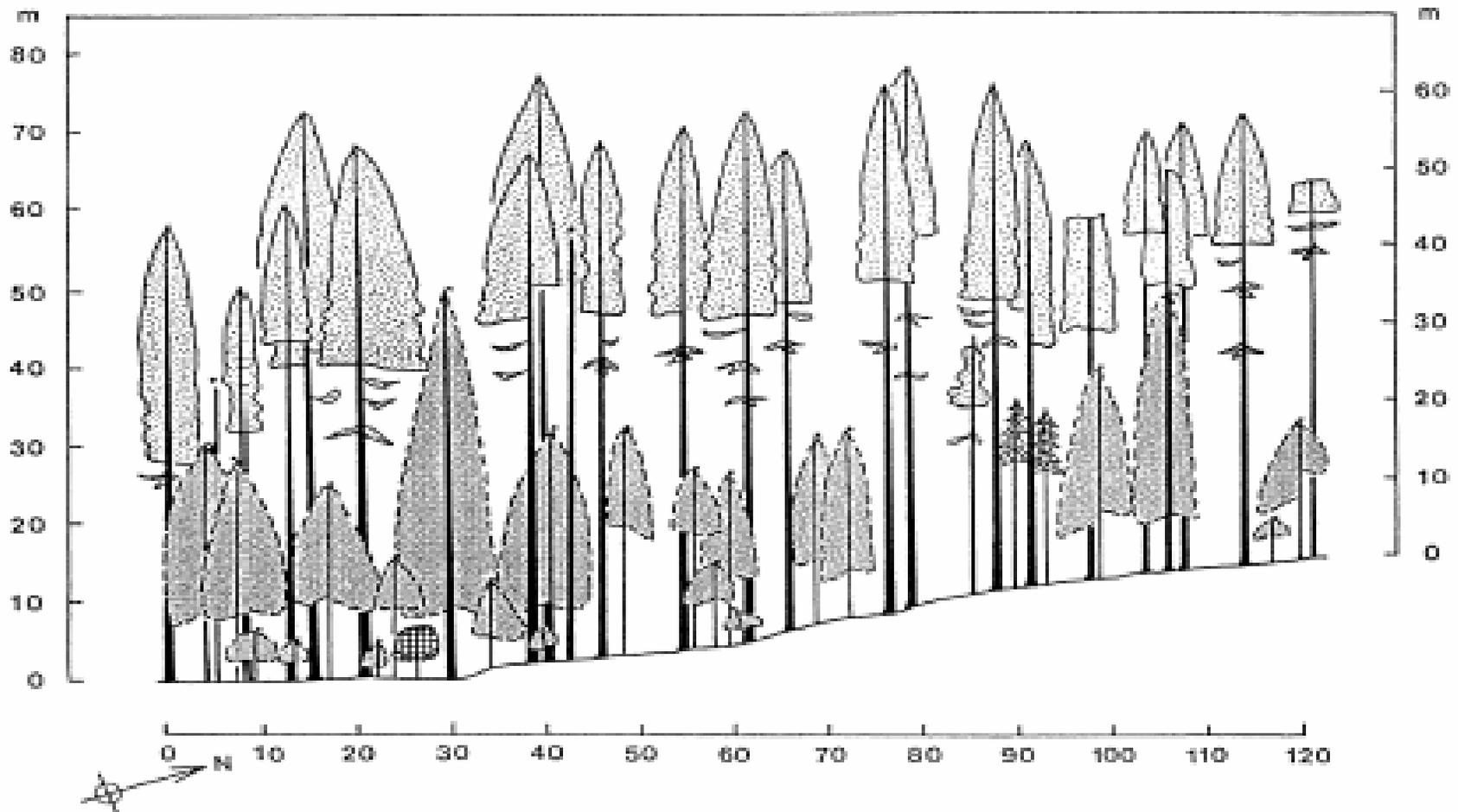
Active → Passive Management



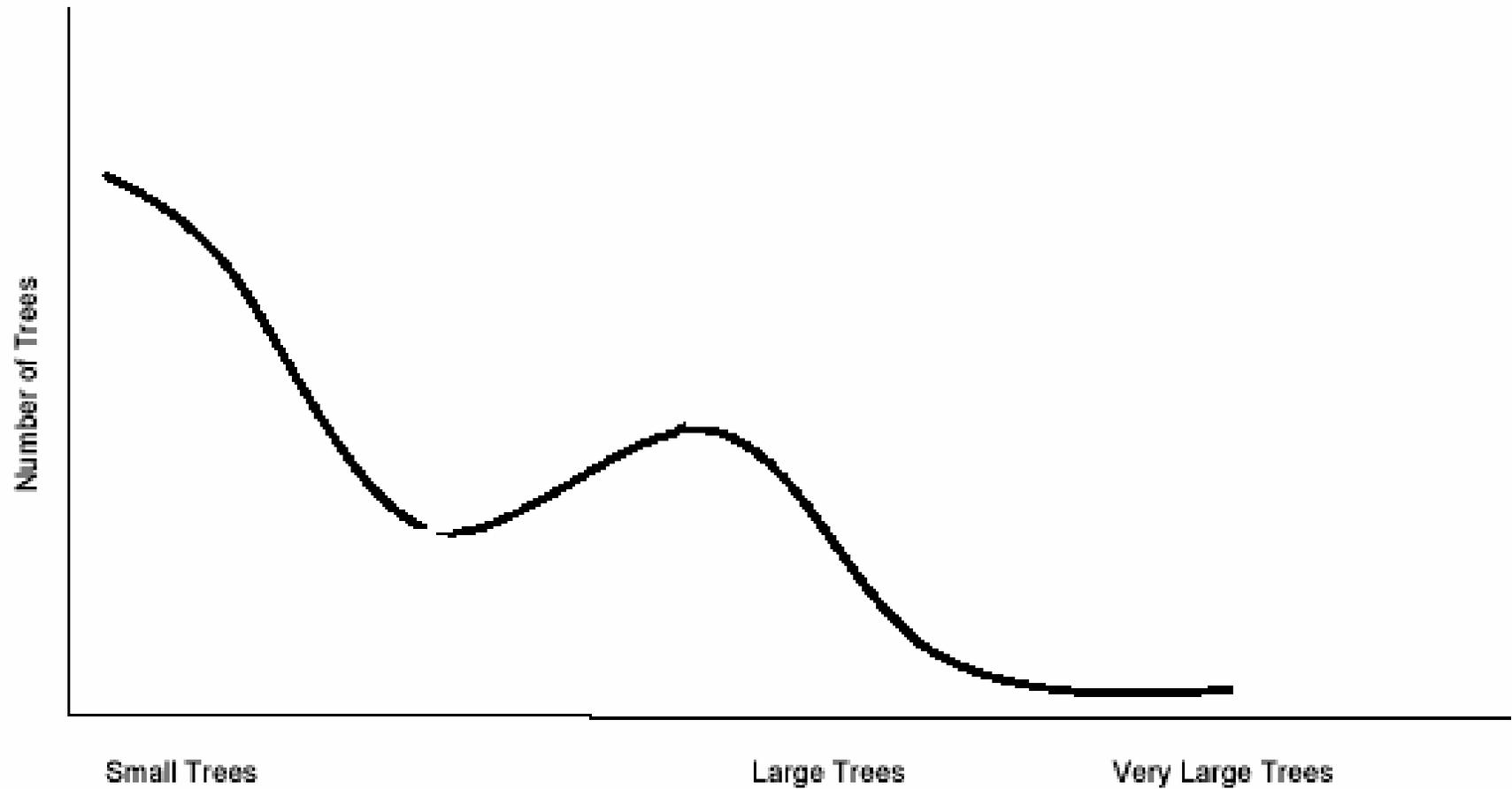
RDFC = getting to old-forest

- Describes riparian forests that resemble the stages of Developed Understory to Niche Diversification.
- Provides a benchmark for stands that are just beginning to have some elements of complexity. Approx 150 yrs.
- A way to measure progress toward a tangible intermediate goal.
- Ultimate goal is Fully Functional stage.

250-yr Doug-fir stand



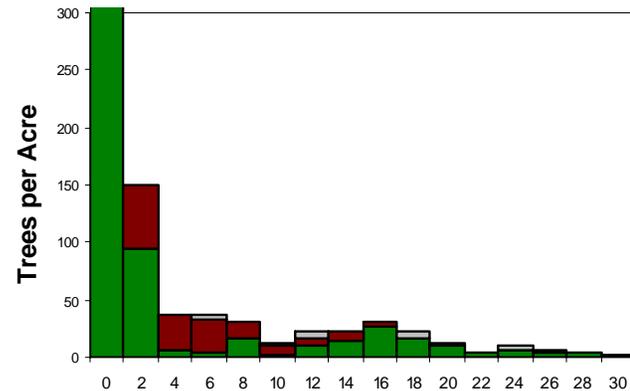
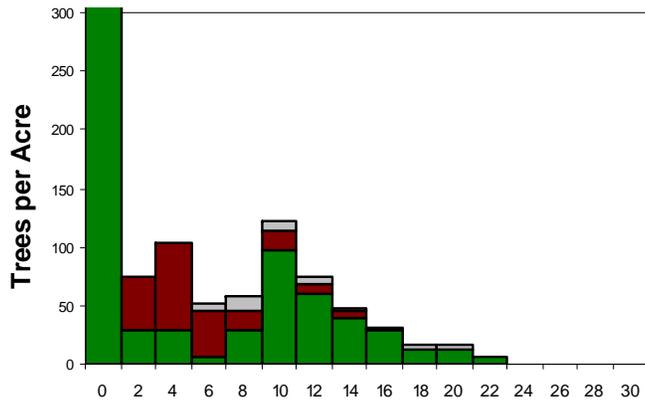
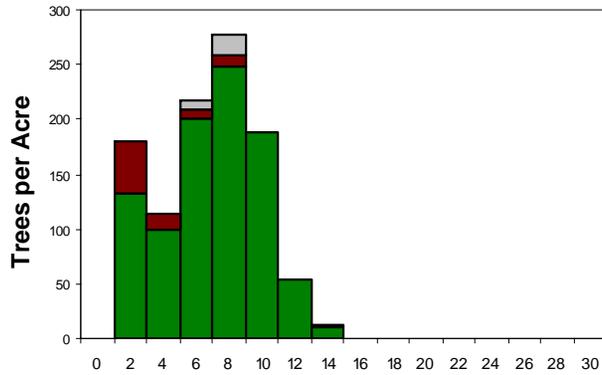
RDFC tpa vs tree diam



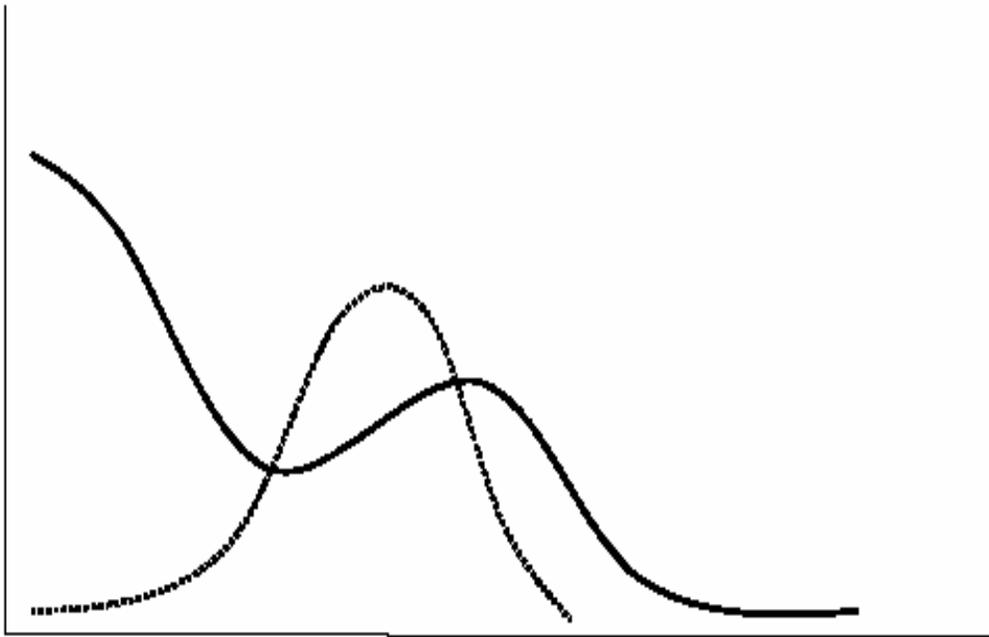
HCP Riparian Mgmt has 5 Aims

- Growing large conifer trees (eg, > 25" dbh).
- Enhance structural complexity of stand.
- Attain a site-adapted tree species composition dominated by conifers.
- Provide DWD and LWD.
- Ensure snags short and long-term.

Thinning results over 70 yrs



Tpa vs Tree Diam for Young Stands compared to RDFC

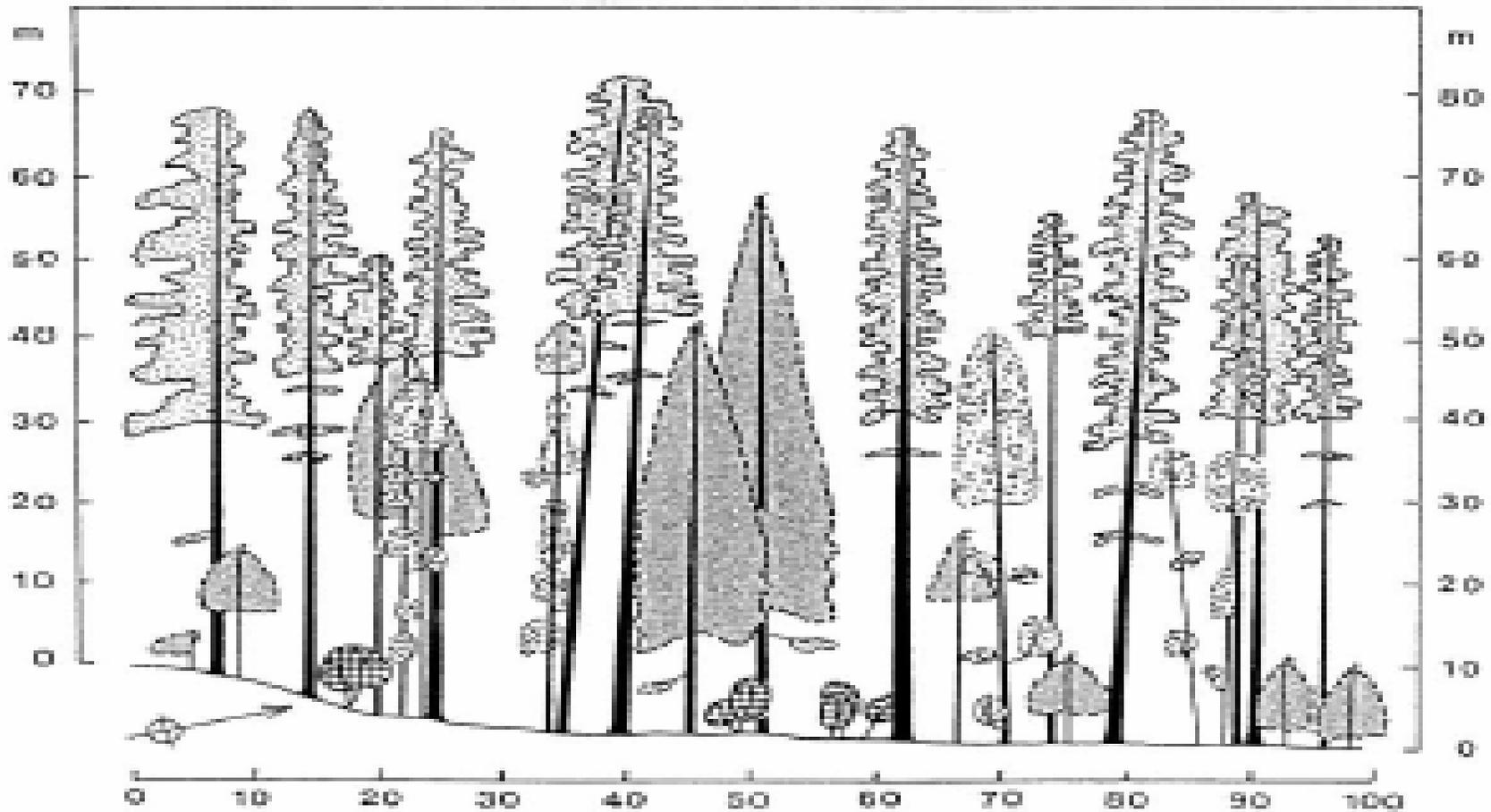


- Structurally simple stands have few large and few small trees.
- Older, structurally complex stands at RDFC have many small, more large, and a few very large trees.

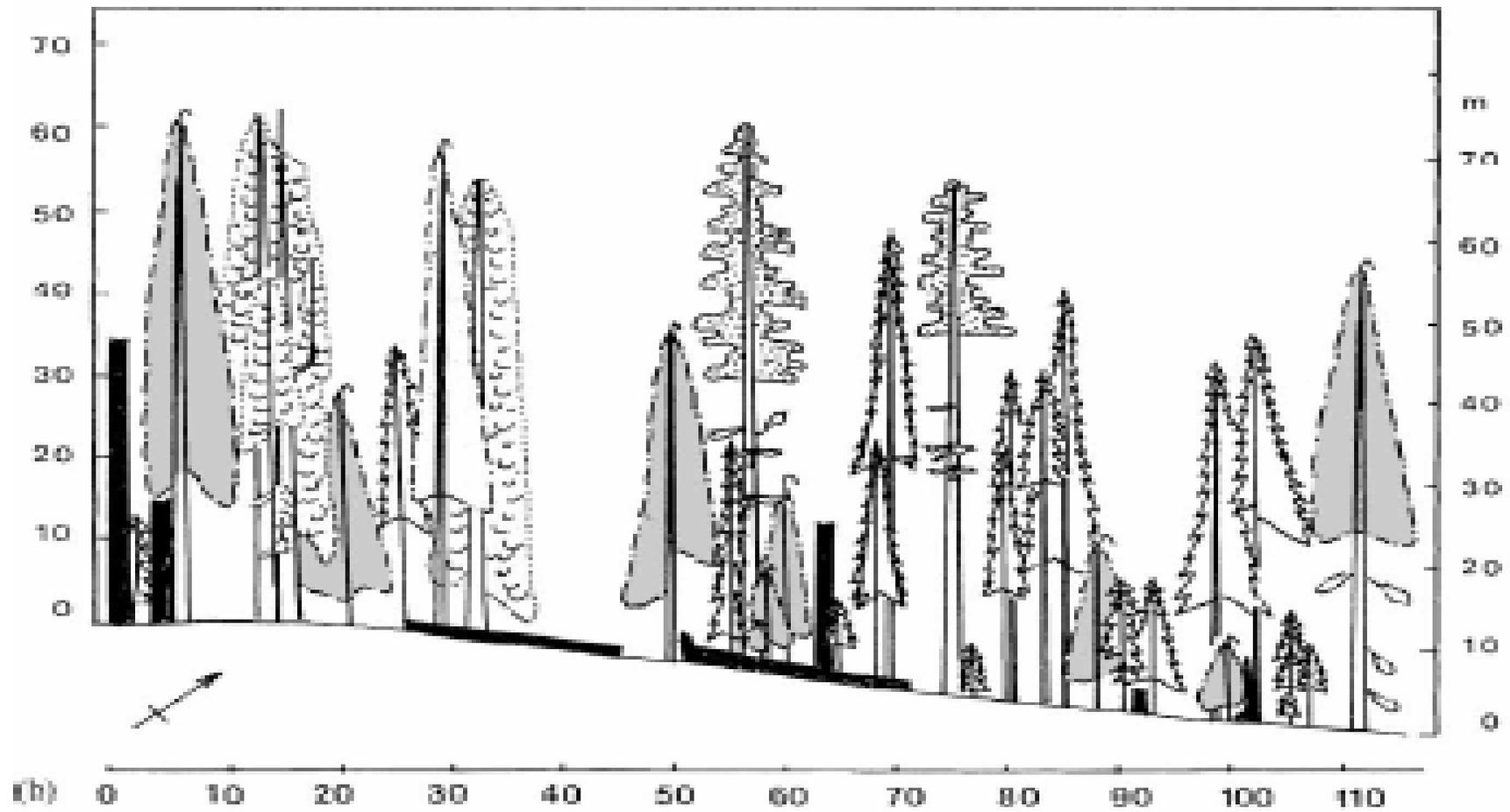
RMZ Passive Management

- HCP assumed approx. 20% RMZs are not capable of supporting conifer forests.
- Floodplains & RMZs with high water-table, unstable soils, or subject to frequent disturbance are naturally hardwood-dominated. Disturbance regime is key
- Small fraction of conifer RMZs are already on trajectory to meet RDFC.

450-yr Doug-fir stand



1000-yr stand



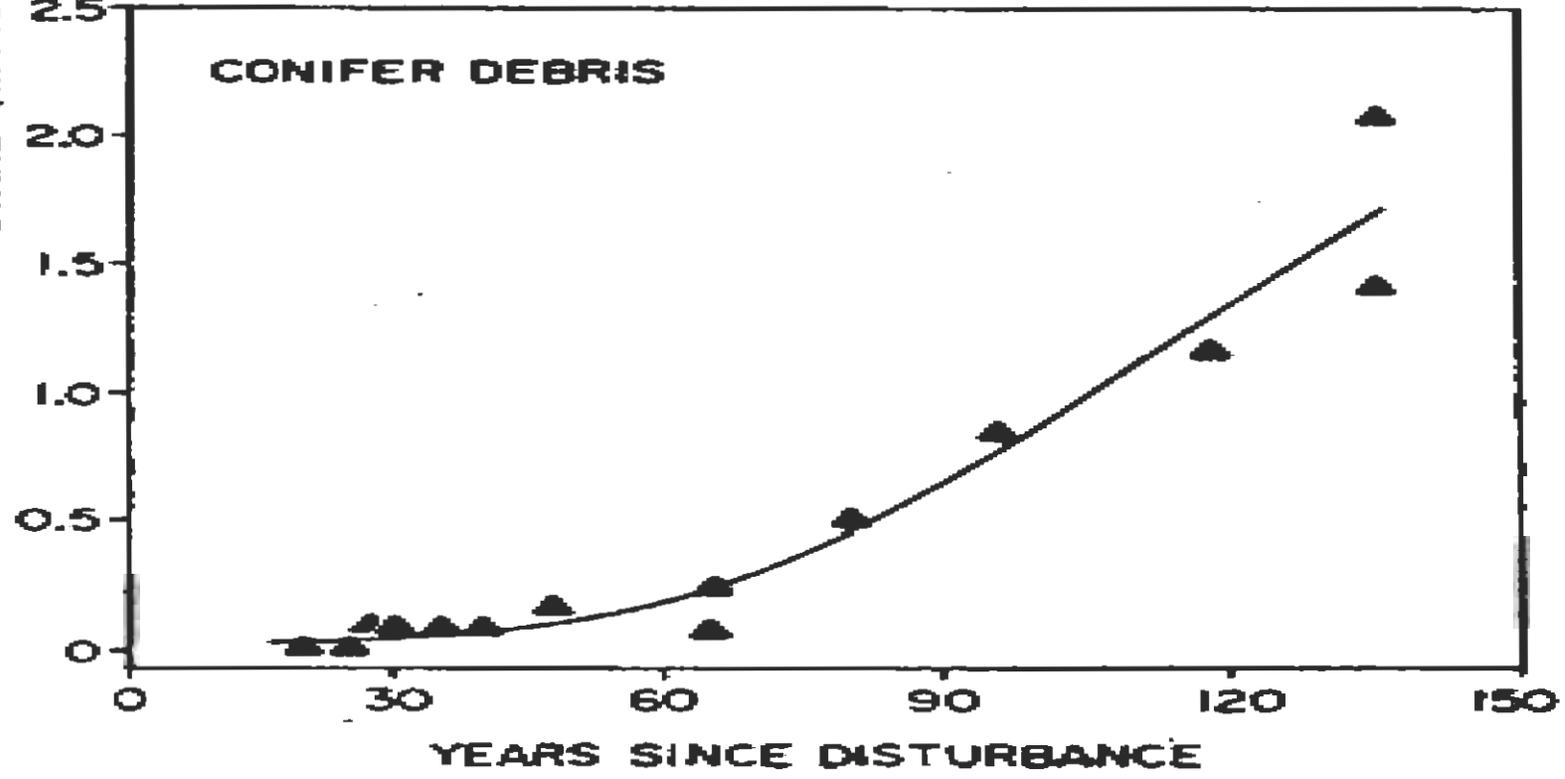
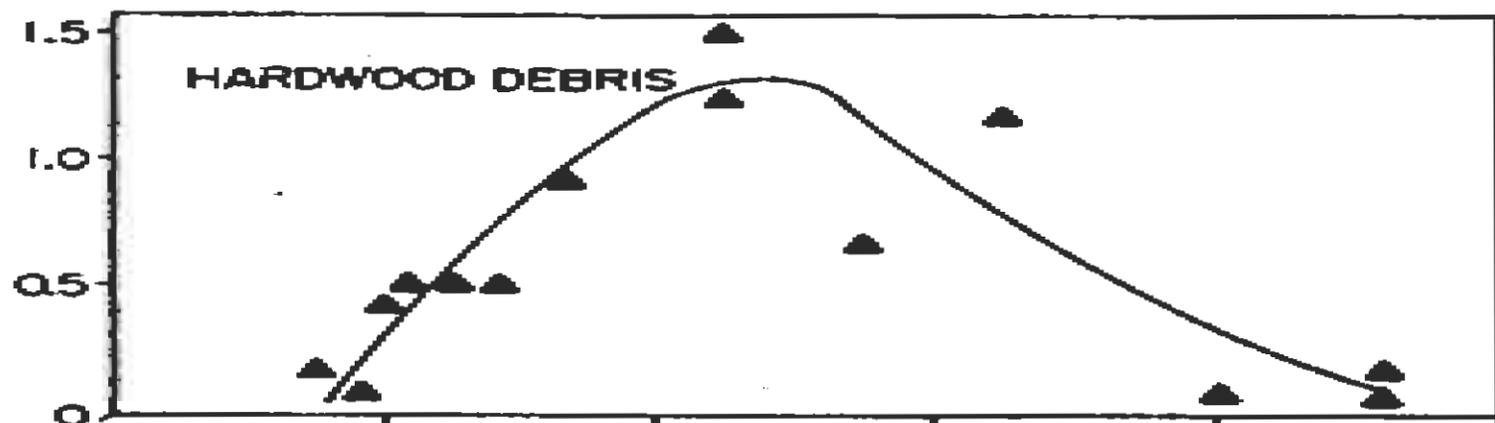
Fully Functional forest, Oly NP



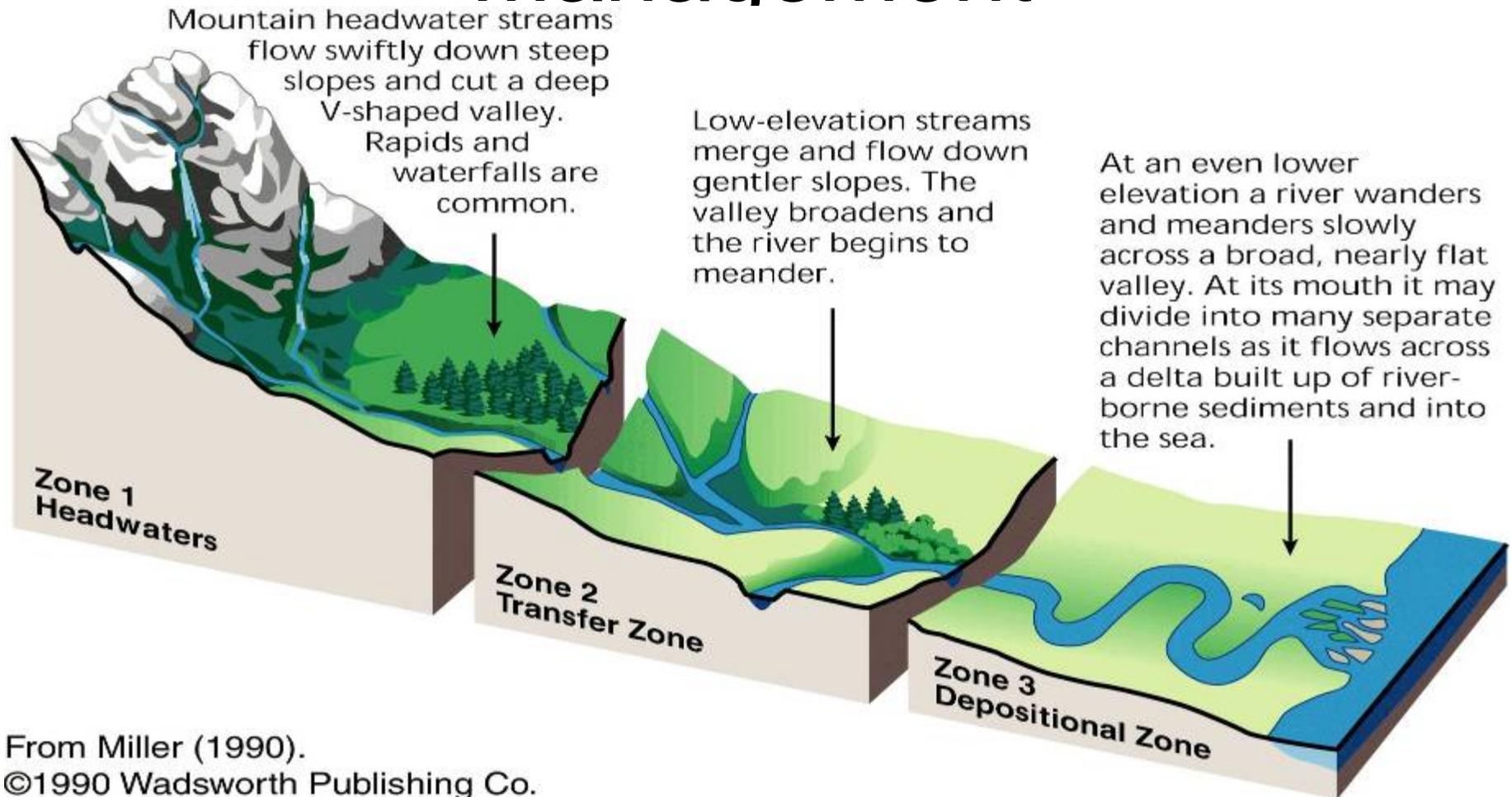
RDFC → Instream Conditions

- Instream conditions follow much later in time than functional riparian conditions – how much time depends on channel types and disturbance history.
- Certain instream conditions rely on large conifer (>27 inch diam bole).
- Increasingly functional aquatic habitats as riparian forest increases in shade, shrubs, and large-sized conifer boles.

VOLUME OF WOODY DEBRIS ORIGINATING IN CURRENT STAND ($m^3/100 m^2$)

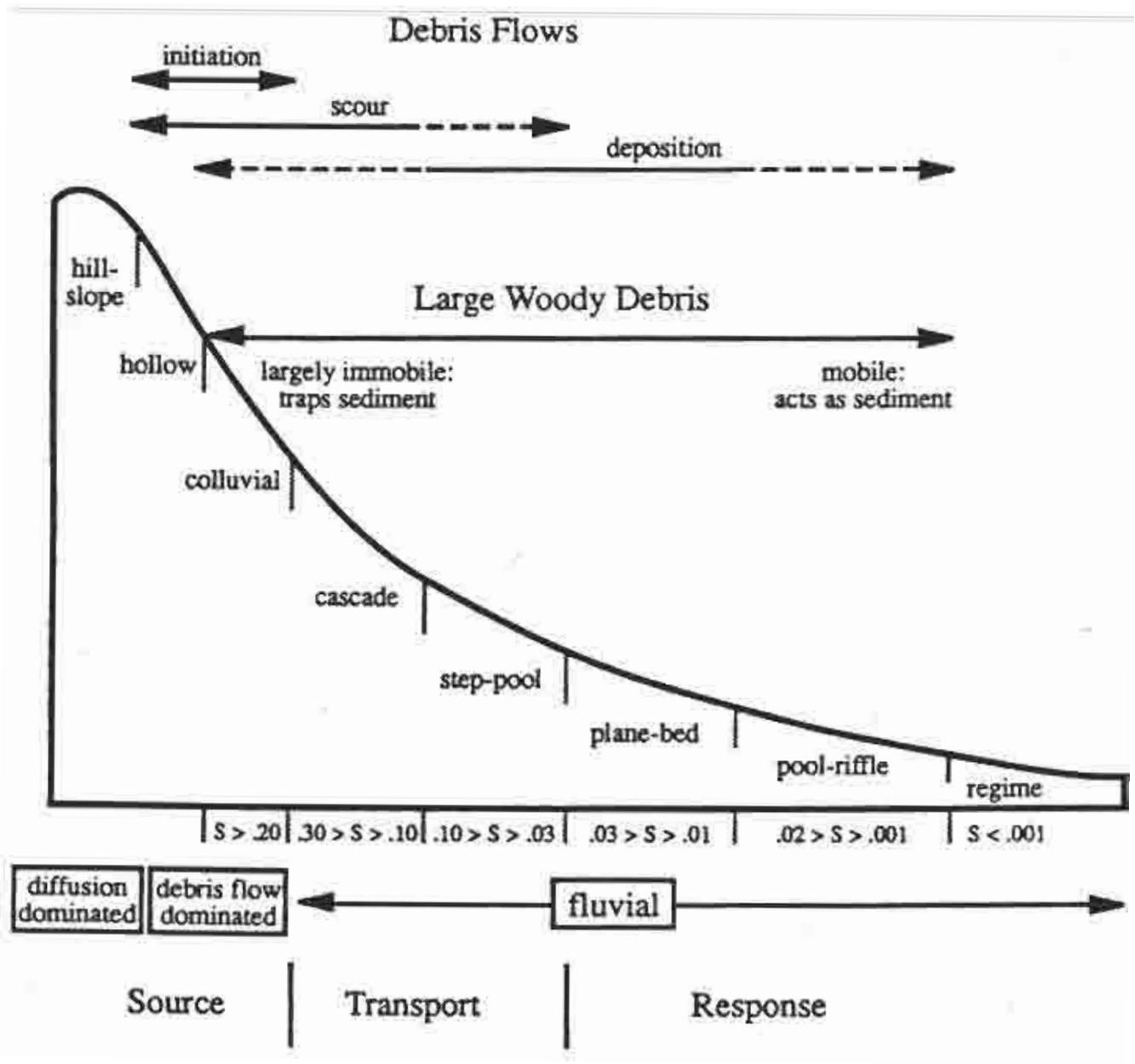


Channel Form and Management



From Miller (1990).
©1990 Wadsworth Publishing Co.

Fig. 1.27 – Three longitudinal profile zones.
In *Stream Corridor Restoration: Principles, Processes, and Practices*, 10/98.
Interagency Stream Restoration Working Group (15 Federal Agencies of the US).

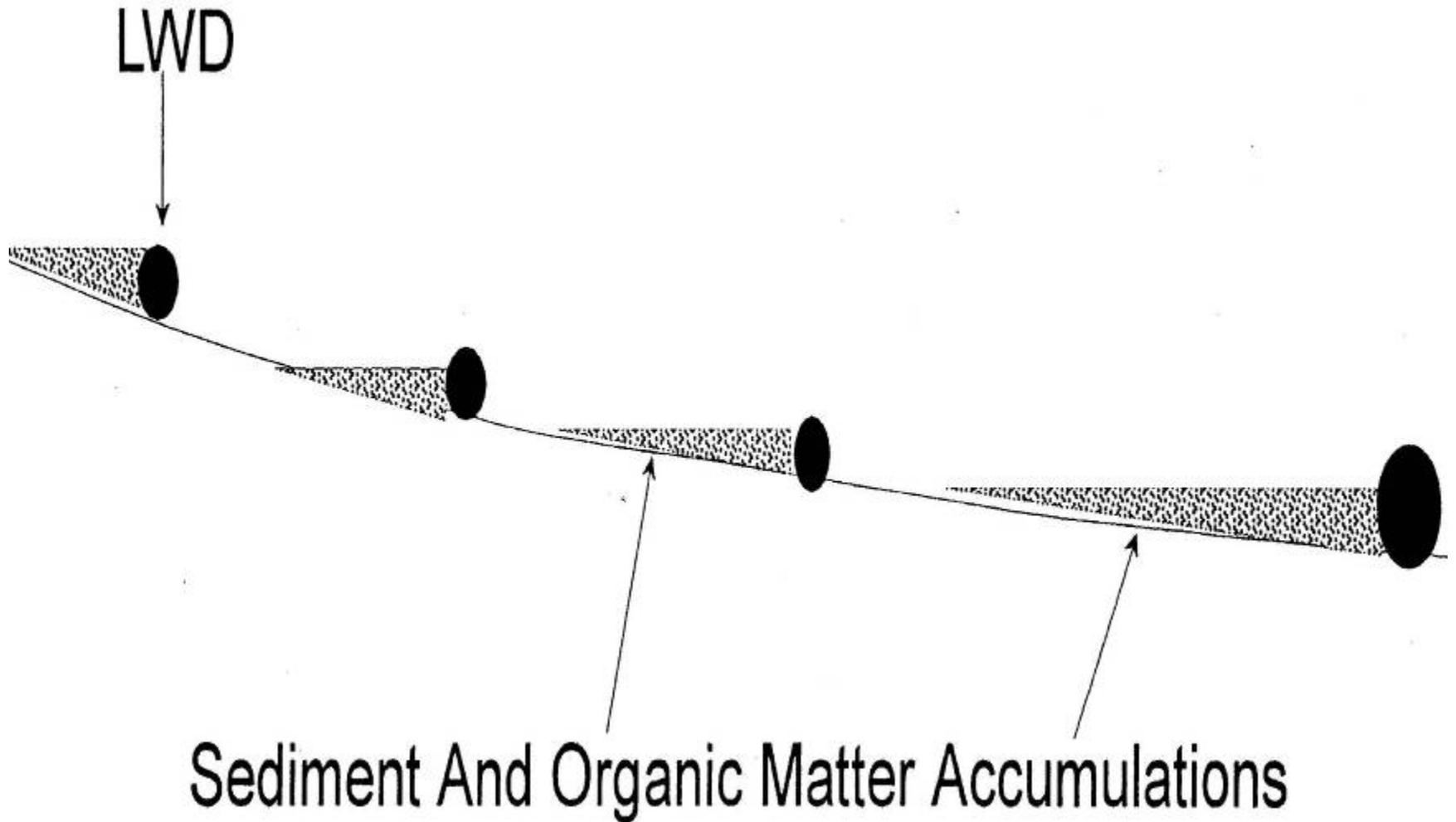


Large LWD has special function

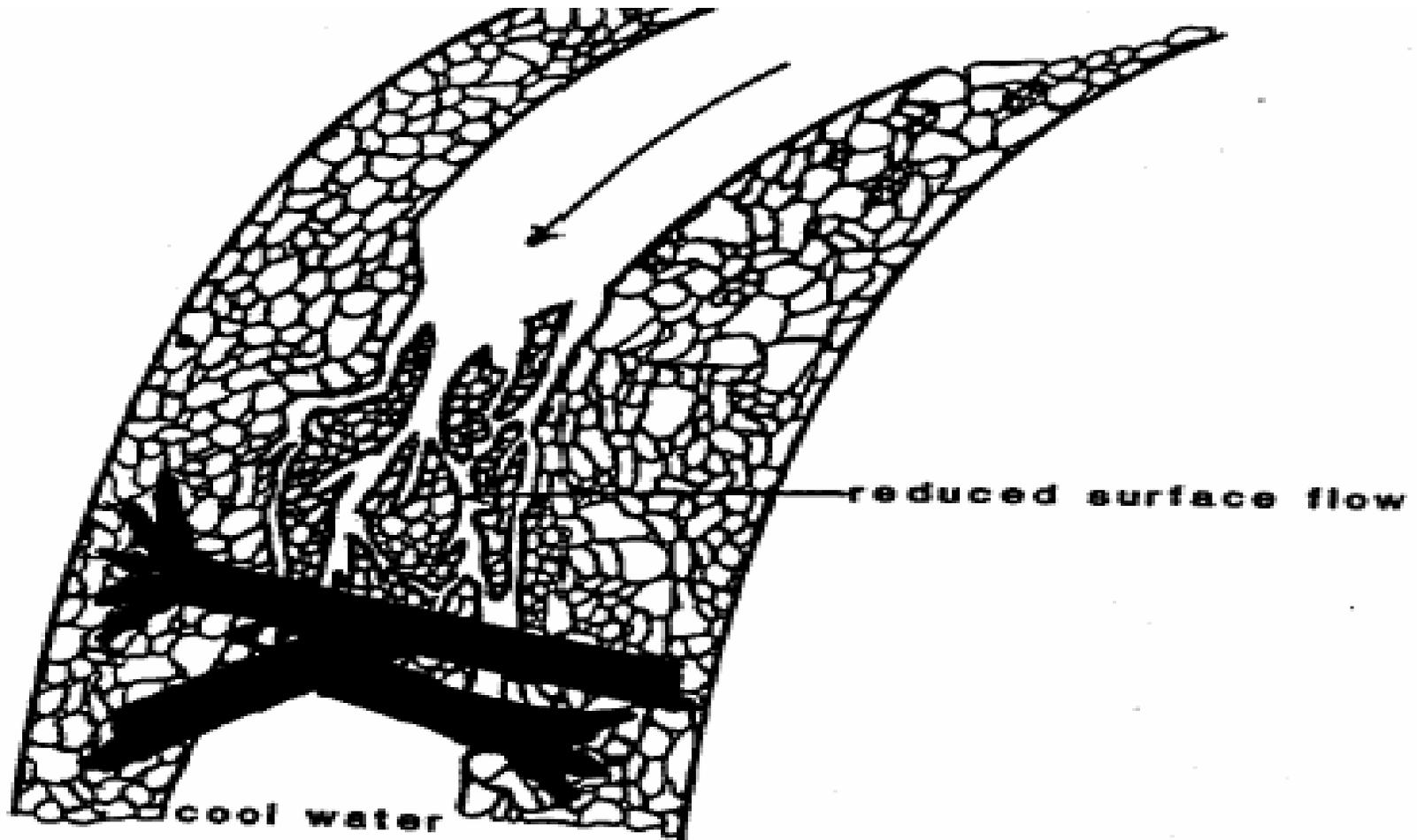
In small mountain streams, “valley-spanning log jams create alluvial channels – hospitable to aquatic life – in what would otherwise be bedrock reaches. The formation of such jams depends critically on the stabilizing presence of logs derived from the largest trees* in the riverside forests...” Montgomery et al. 1996

*Functional bole diameter at least 27”

LWD forms Gradient Steps



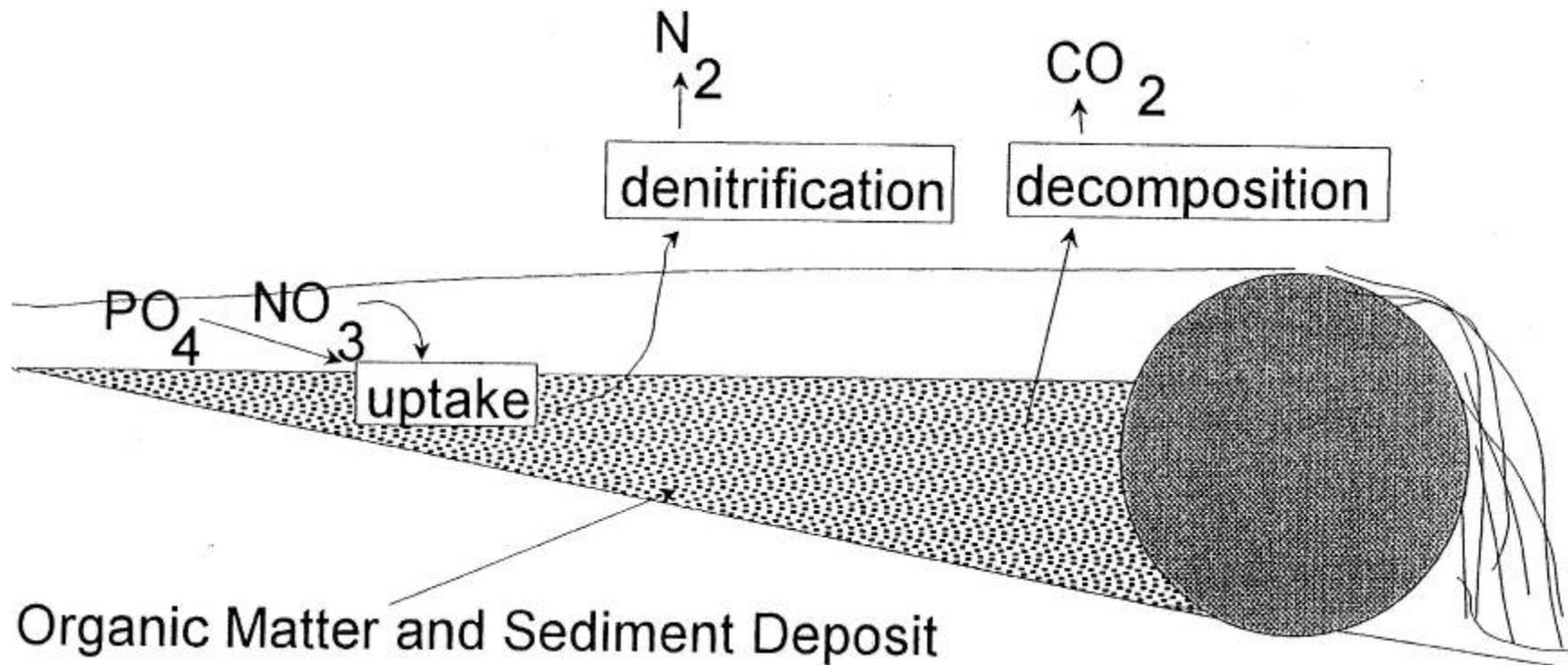
Flow through Stream Bed



Big LWD in Small Streams

- Habitat heterogeneity - waterfalls, flats
- Sediment retention – deposits, energy dissipation
- Organic material storage – non-woody material, export of altered organic matter
- Nutrient storage & transformation - nutrient storage, influence on dissolved material
- Thermal influence – surface & sub-surface

Nutrients are Transformed



Values of Larger LWD

- Channel Form
 - Larger waterfalls
 - Sediment Transport
 - Larger pools
 - Greater diversity of pool types
- Organic Matter Storage -- larger CPOM, greater storage on terraces
- Sediment Transport – larger deposits

