Appendix IV. A sampling of conceptual model diagrams.

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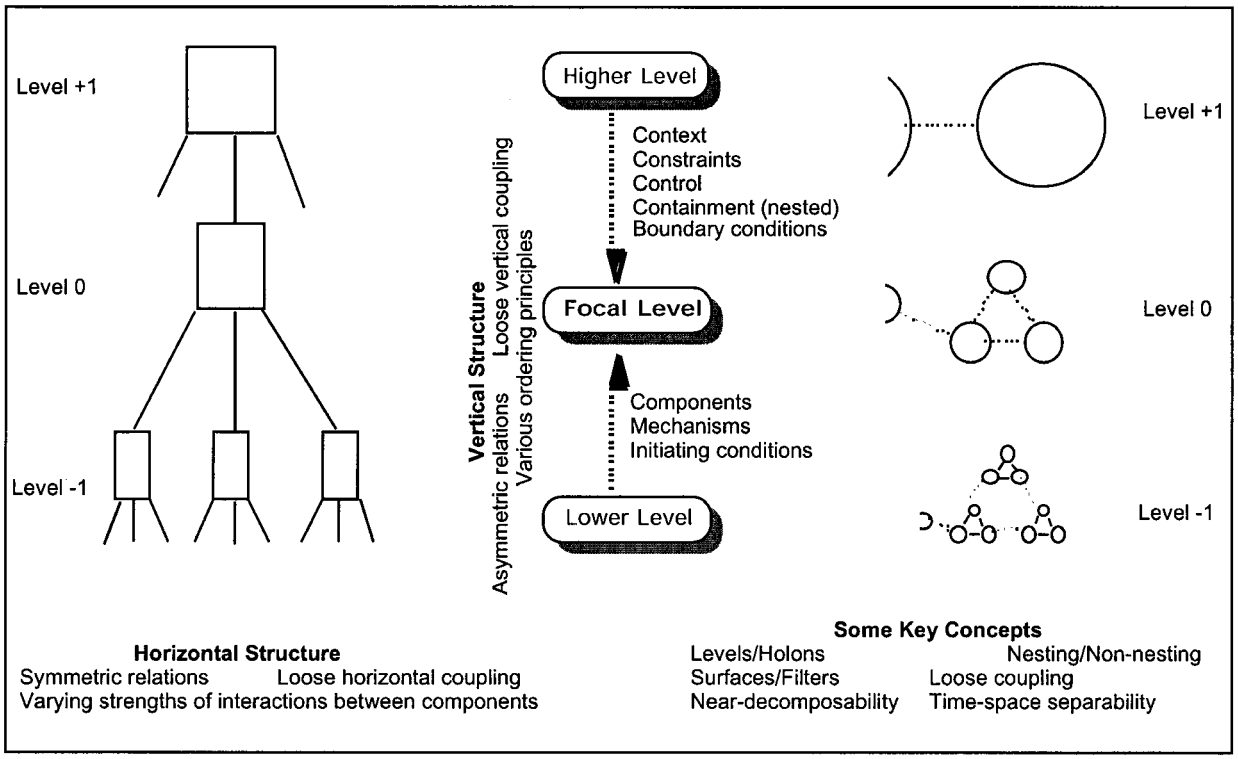


Fig. 2. Illustration of hierarchy theory with its major concepts (based on various diagrams and concepts in Simon, 1962, 1973; Koestler, 1967; Allen and Starr, 1982; O'Neill et al., 1986).

Figure 1. Hierarchy theory concepts (Wu 1999).

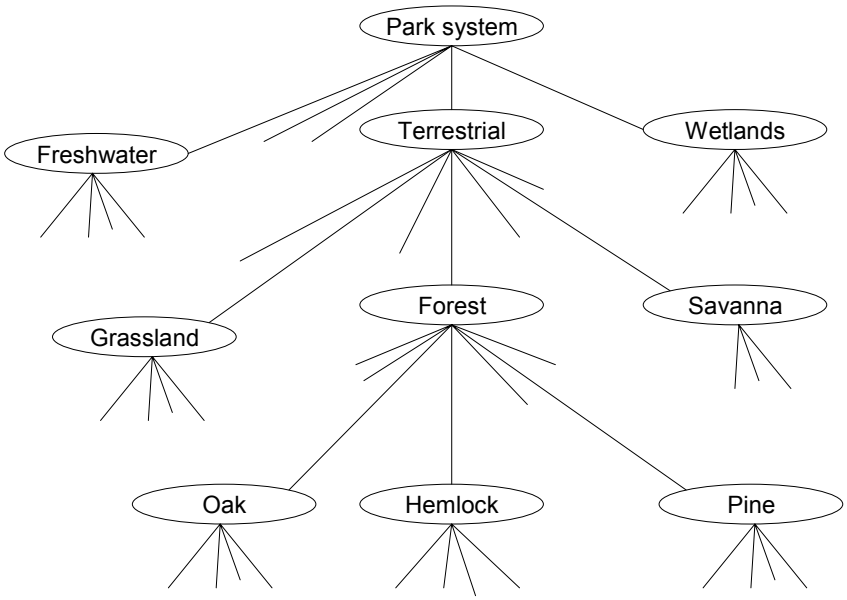
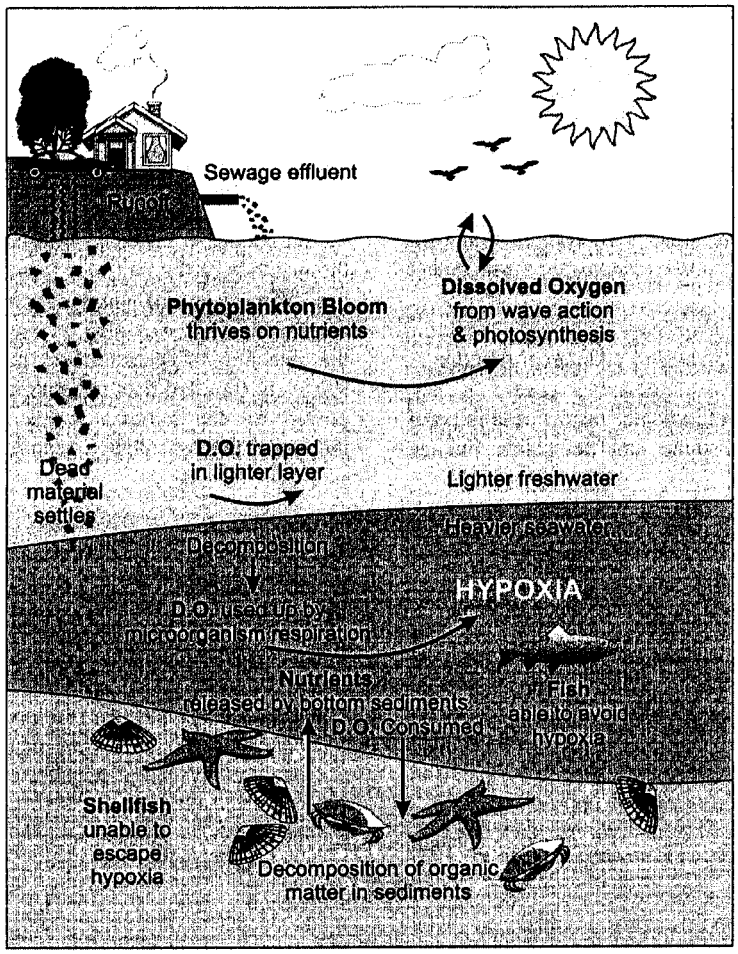
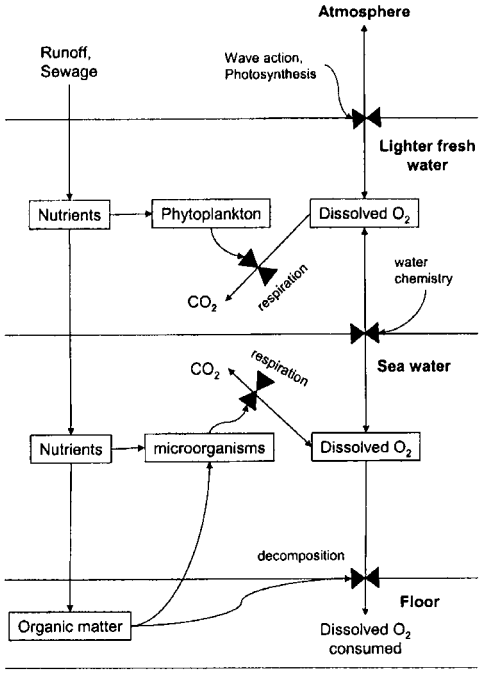


Figure 2. Example of hierarchical decomposition of park into hatibat types.





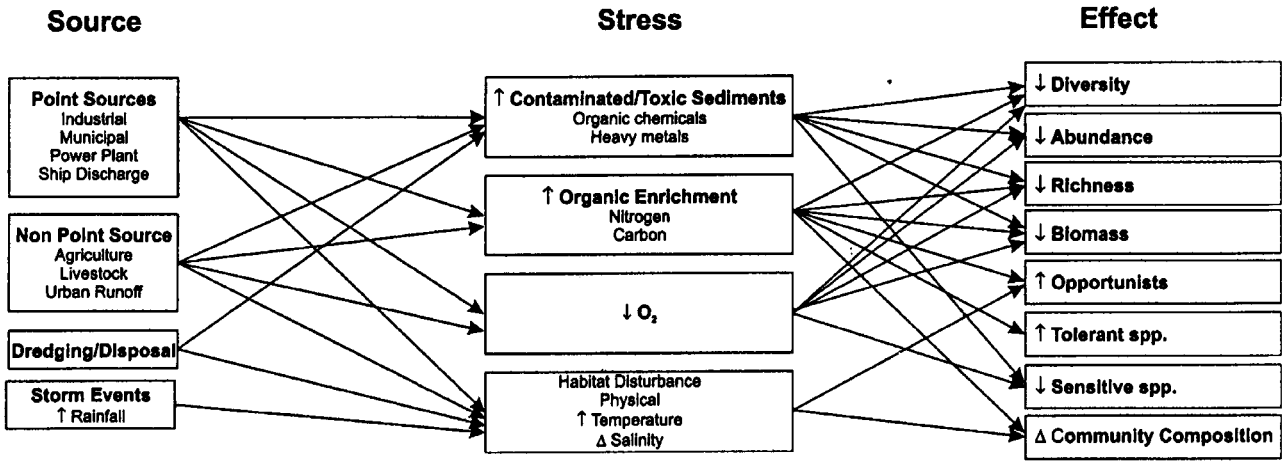


Figure 3. Alternative representations of an aquatic system in control and stressor models (modified from Manley et al. 2000).

Summary of Relationships of Mukwonago River Wetland Types to Important Biogeochemical Gradients

(adapted from Vitt and Kuhry 1992)

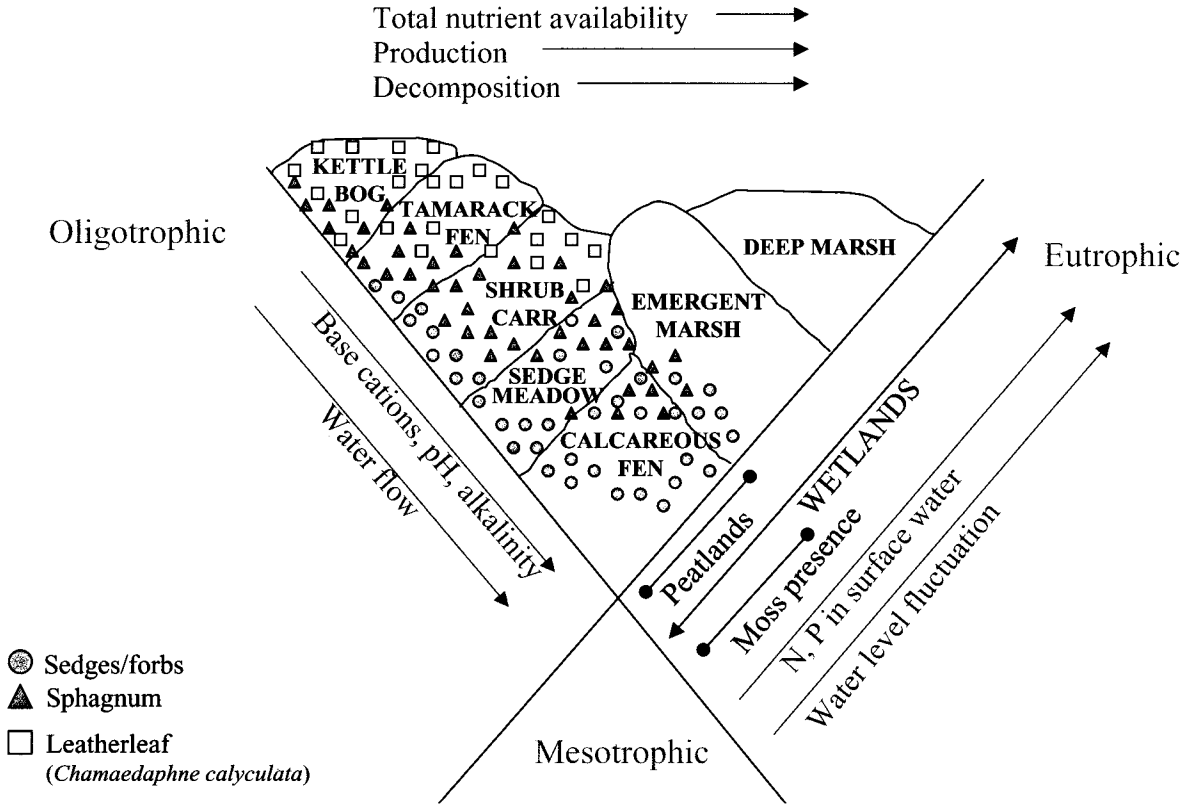


Figure 4. Ordination of wetland habitat types (http://tnc-ecomanagement.org/images/muk_models.pdf).

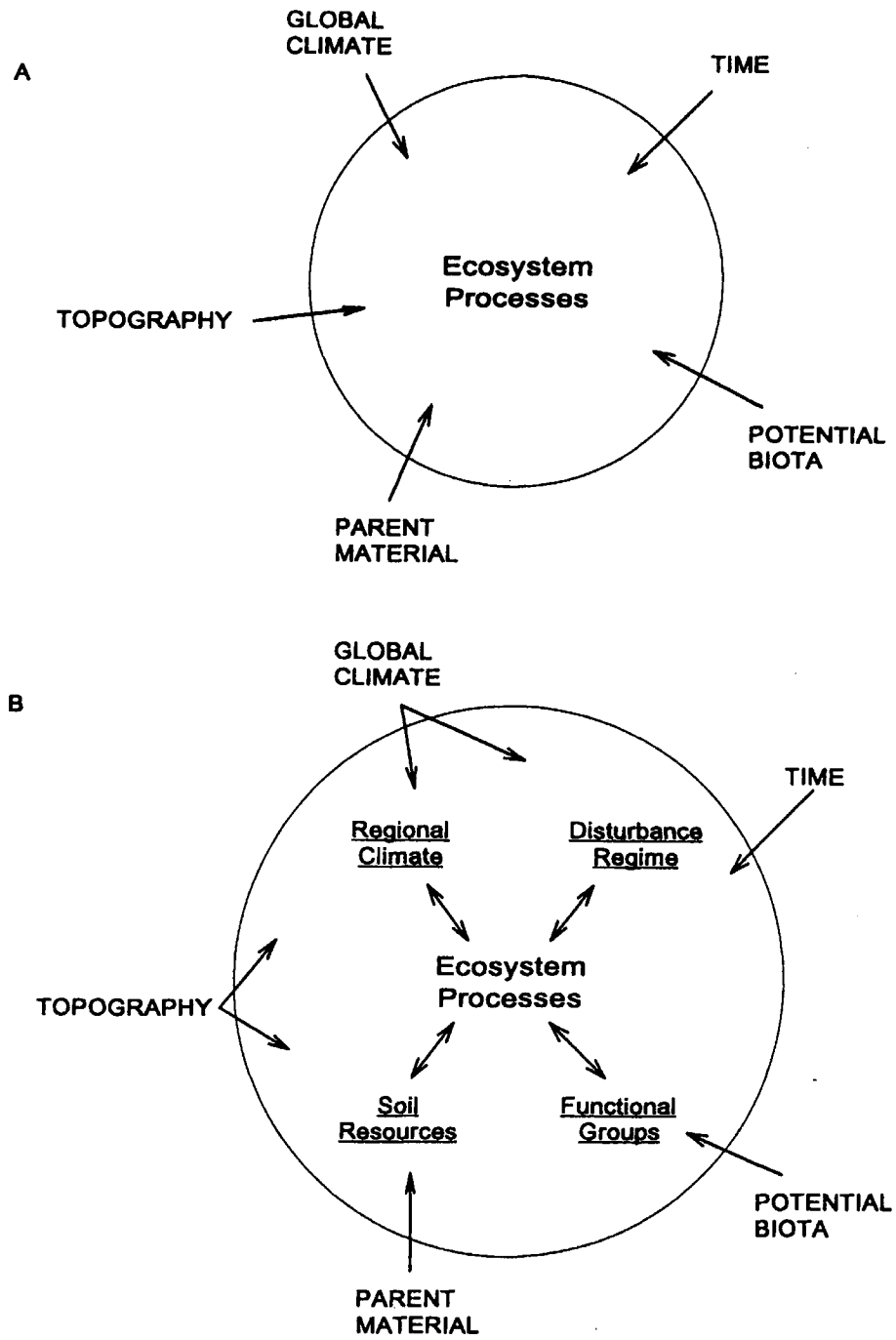


FIG. 2.—The relationship (*A*) between state factors and ecosystem processes and (*B*) among state factors, interactive controls, and ecosystem processes. See text for explanation. State factors are capitalized, interactive controls are underlined, and the circle represents the boundary of the ecosystem.

Figure 5. Jenny-Chapin conceptual model of large-scale system controls . (Chapin et al. 1996).

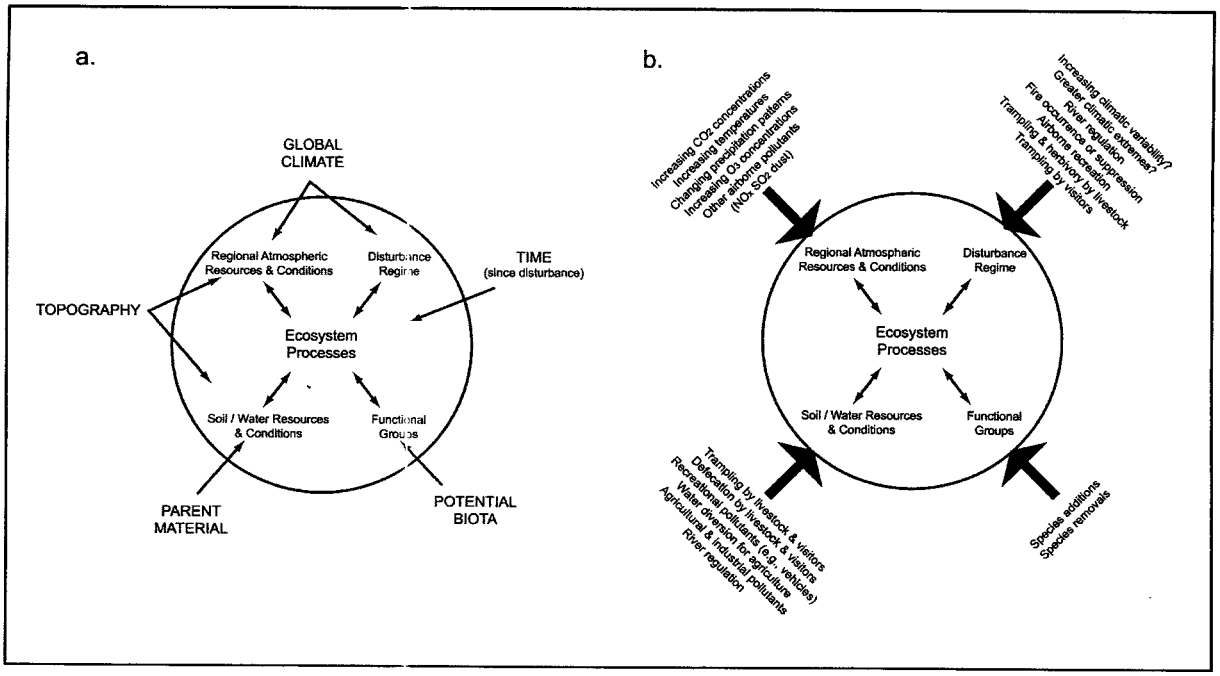


Figure 13. Modified version (a) of the interactive-control model that serves as the general ecosystem model for the NCPN, and (b) the array of stressors affecting NCPN ecosystems arranged in the model in relation to their first-order effects.

Figure 6. Jenny-Chapin model interpreted and enhanced for the Northern Colorado Plateau conceptual modeling framework. (Evenden et al. 2002).

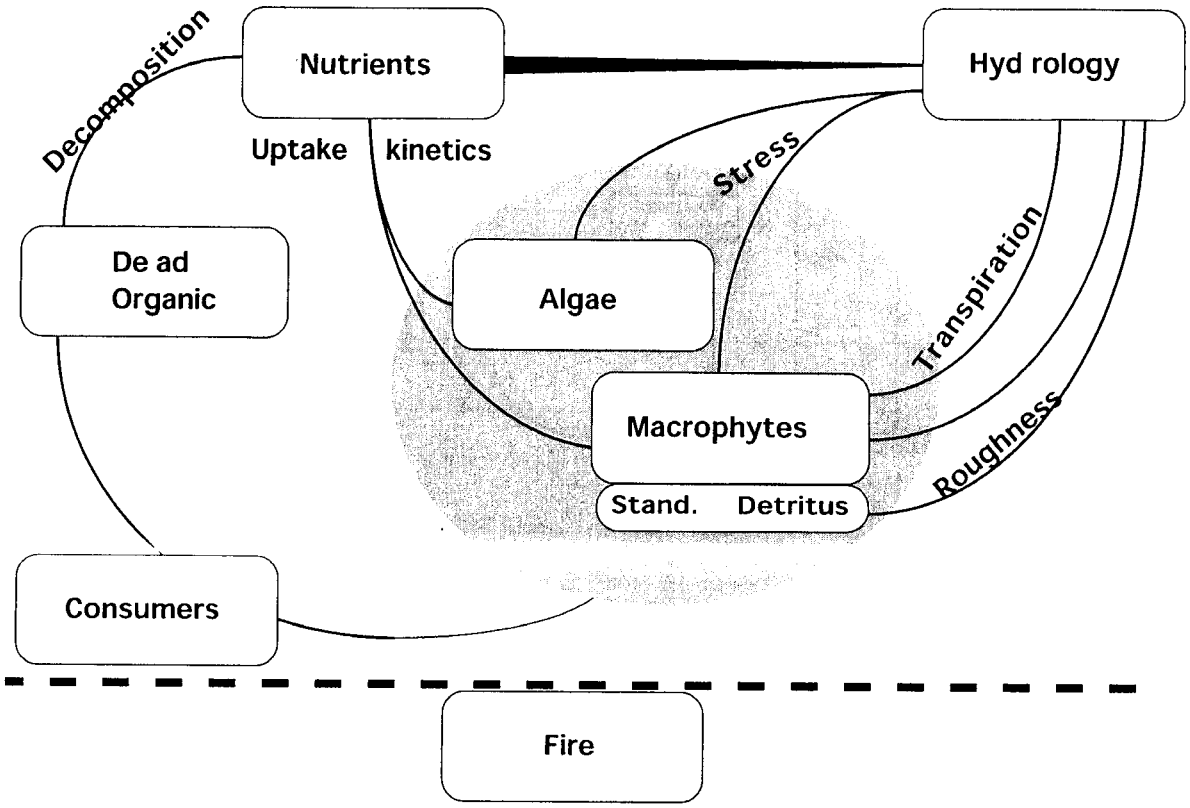


Figure 1. The process- oriented feedbacks among the biotic and abiotic sectors of the GEM. Dynamics of live and standing dead macrophytes alter surface water runoff through changes in structure and thus surface roughness. Water losses via transpiration vary with changes in biomass (leaf area index) and physical canopy structure. Availability of water in surface, unsaturated and saturated storage is one control on plant growth and mortality. Hydrologic algorithms also transport dissolved nutrients and control their remineralization, while nutrient availability and uptake kinetics can control plant growth. Dead organic matter, in different forms of storage and with different C:N:P ratios, is the source for nutrient cycling. Consumers sequester plant biomass, delaying its incorporation into detrital pools. Fire may generally affect the whole system.

Figure 7. General ecosystem control model (Fitz et al. 1996).

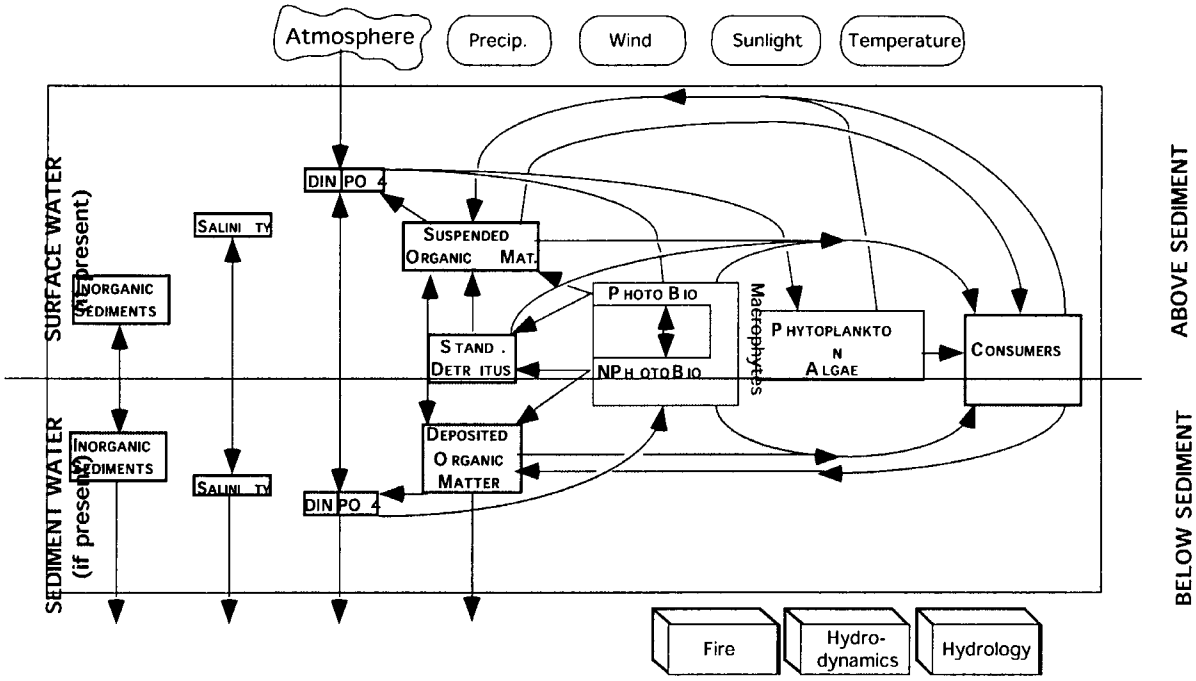


Figure 2. The state variables and most of the linkages of material or information in the GEM, excluding hydrology (Figure 3). Hydrology drives many of the vertical fluxes shown and the unshown horizontal fluxes of materials into and out of the system (cell). State variables are enclosed within rectangles in ALL_CAPS. Environmental forcing functions are in oval boxes; simulations of fire, hydrology, and hydrodynamics affect model dynamics. Metabolic sinks are not indicated. Dissolved Inorganic Nitrogen (DIN) and PO4 are separate state variables with slightly different dynamics. Although not shown, both nutrients are involved in uptake and mineralization processes.

Figure 8. A more detailed model of the General Ecosystem Model (GEM) showing feedbacks for aquatic system (Fitz et al. 1996).

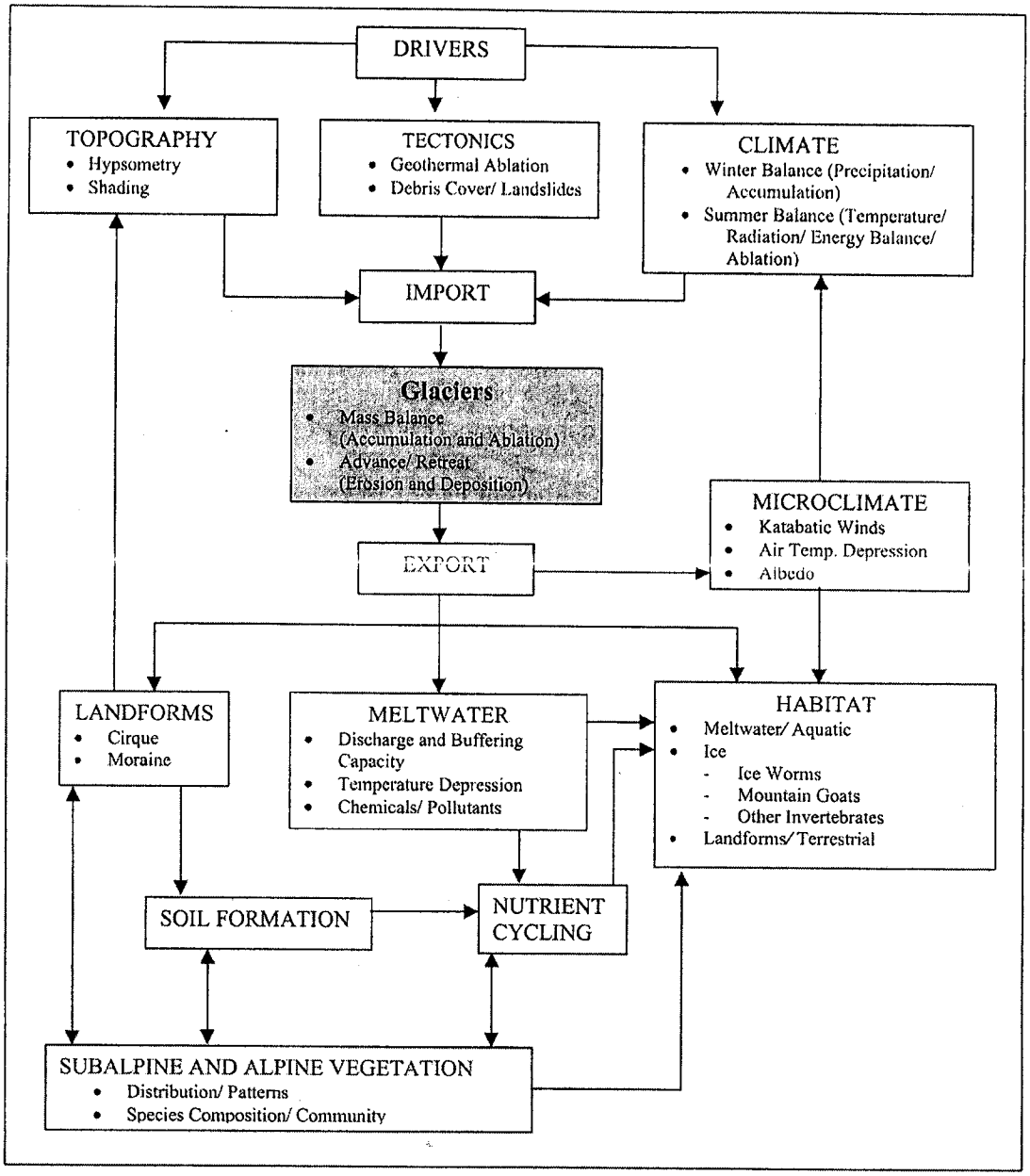


Figure 12. Conceptual model for processes and functions of glaciers in mountain landscapes (J. Reidel, pers. communication)

Figure 9. Glacier control model – North Coast and Cascades Network (Ralph 2002).

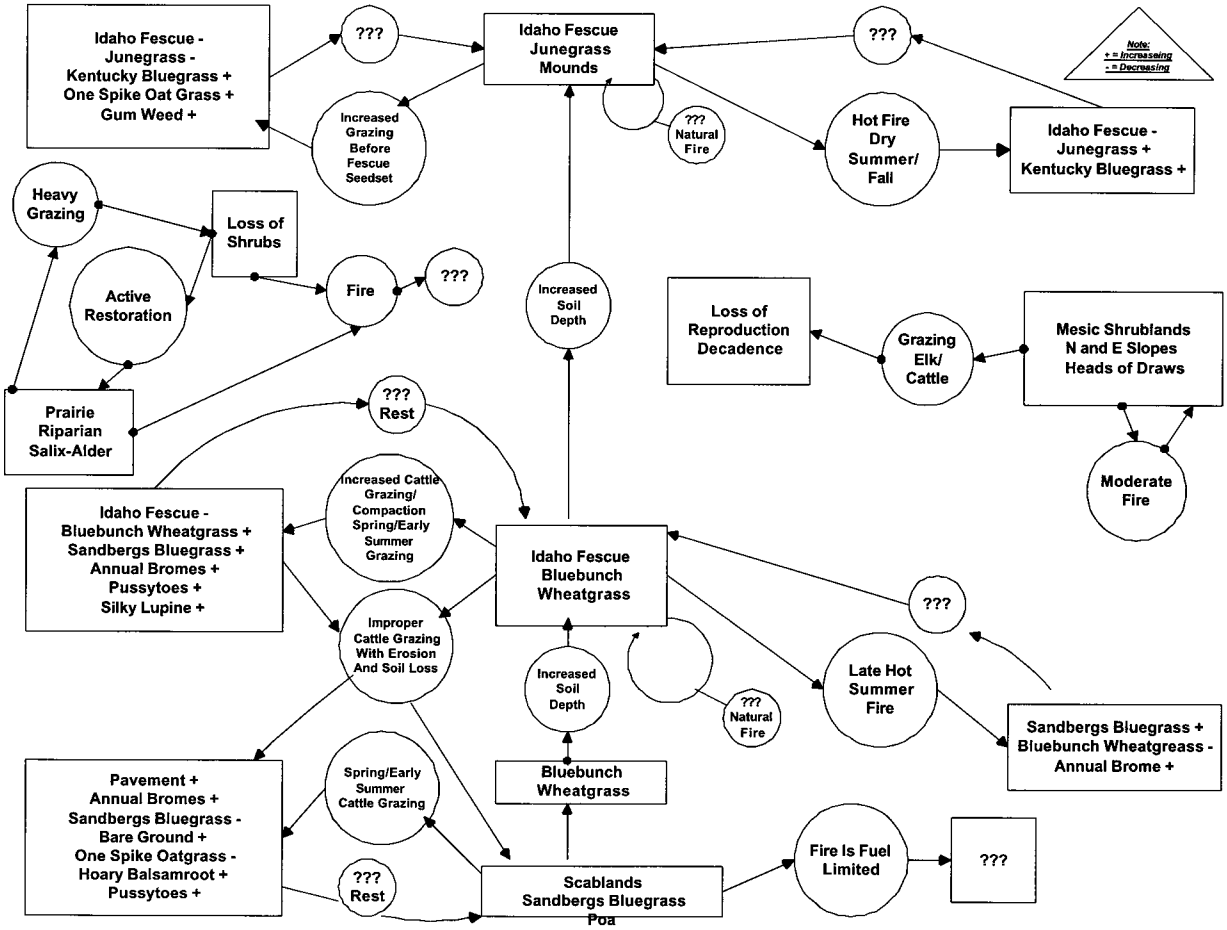


Figure 10. State and transition type model for fescue grassland (TNC ?).

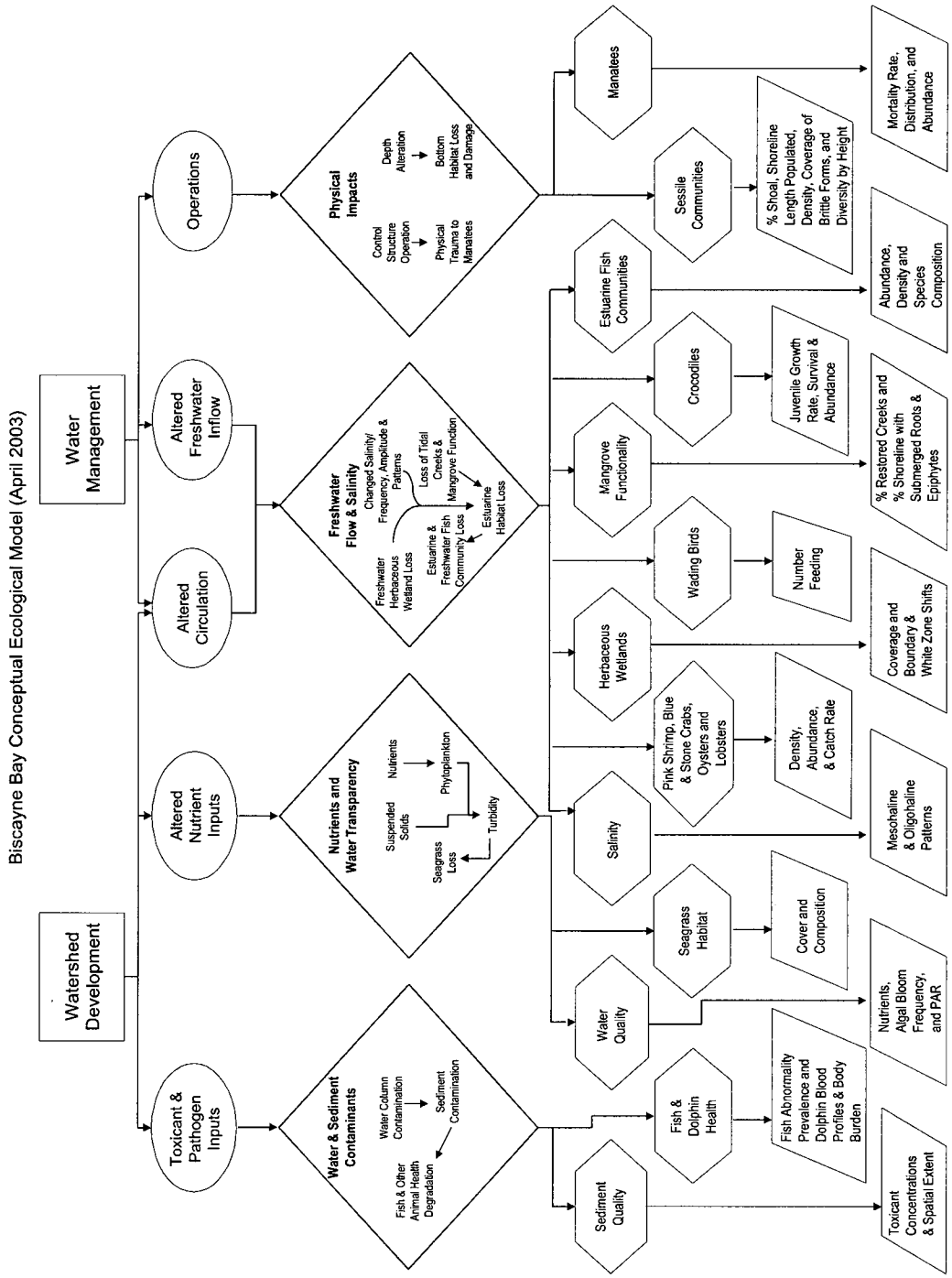


Figure A-16. Biscayne Bay Conceptual Ecological Model diagram

Figure 11. Biscayne Bay stressor model (CERP 2003).

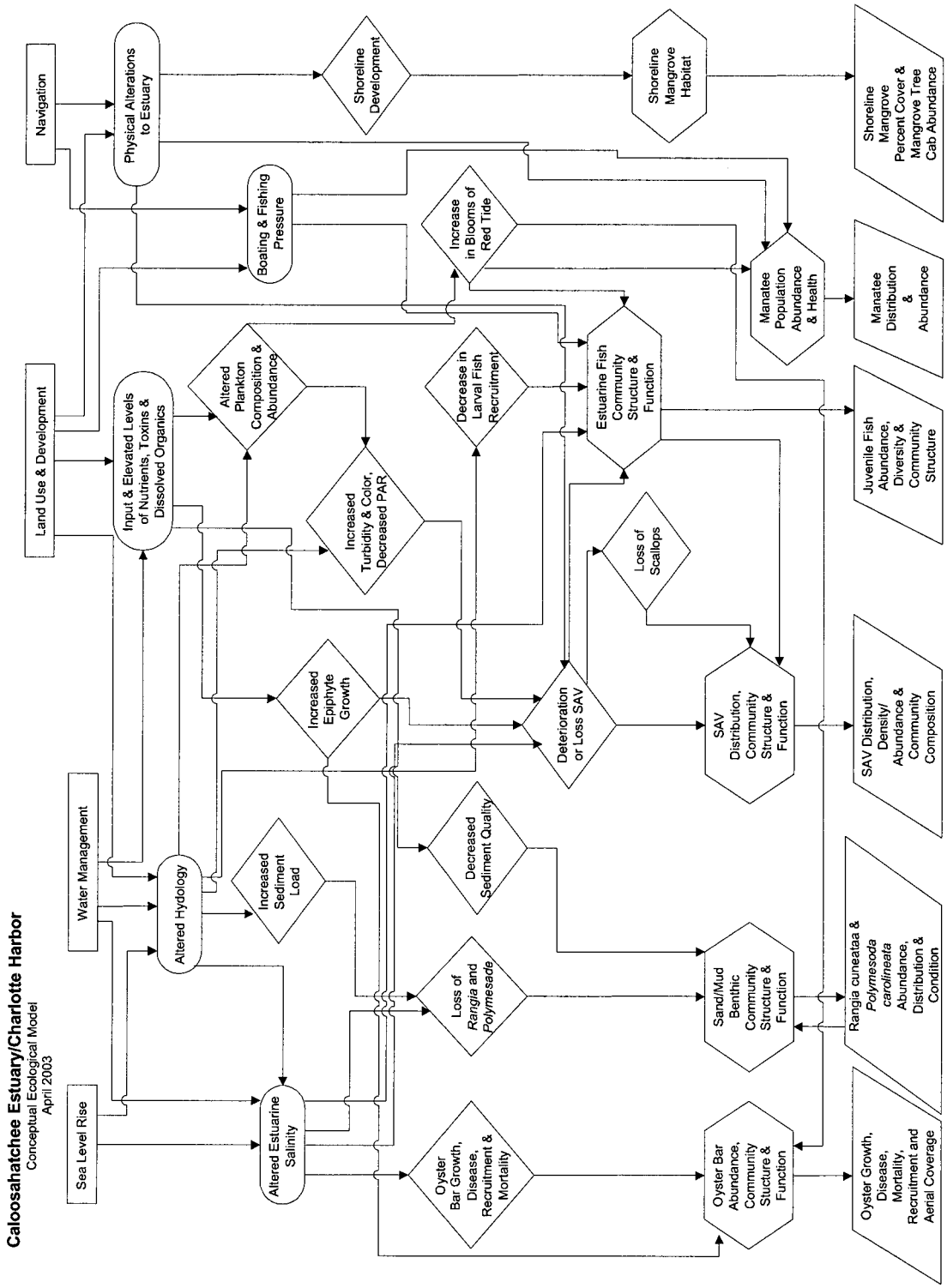


Figure A-19. Caloosahatchee Estuary Conceptual Ecological Model diagram

Figure 12. Caloosahatchee stressor model (CERP 2003).

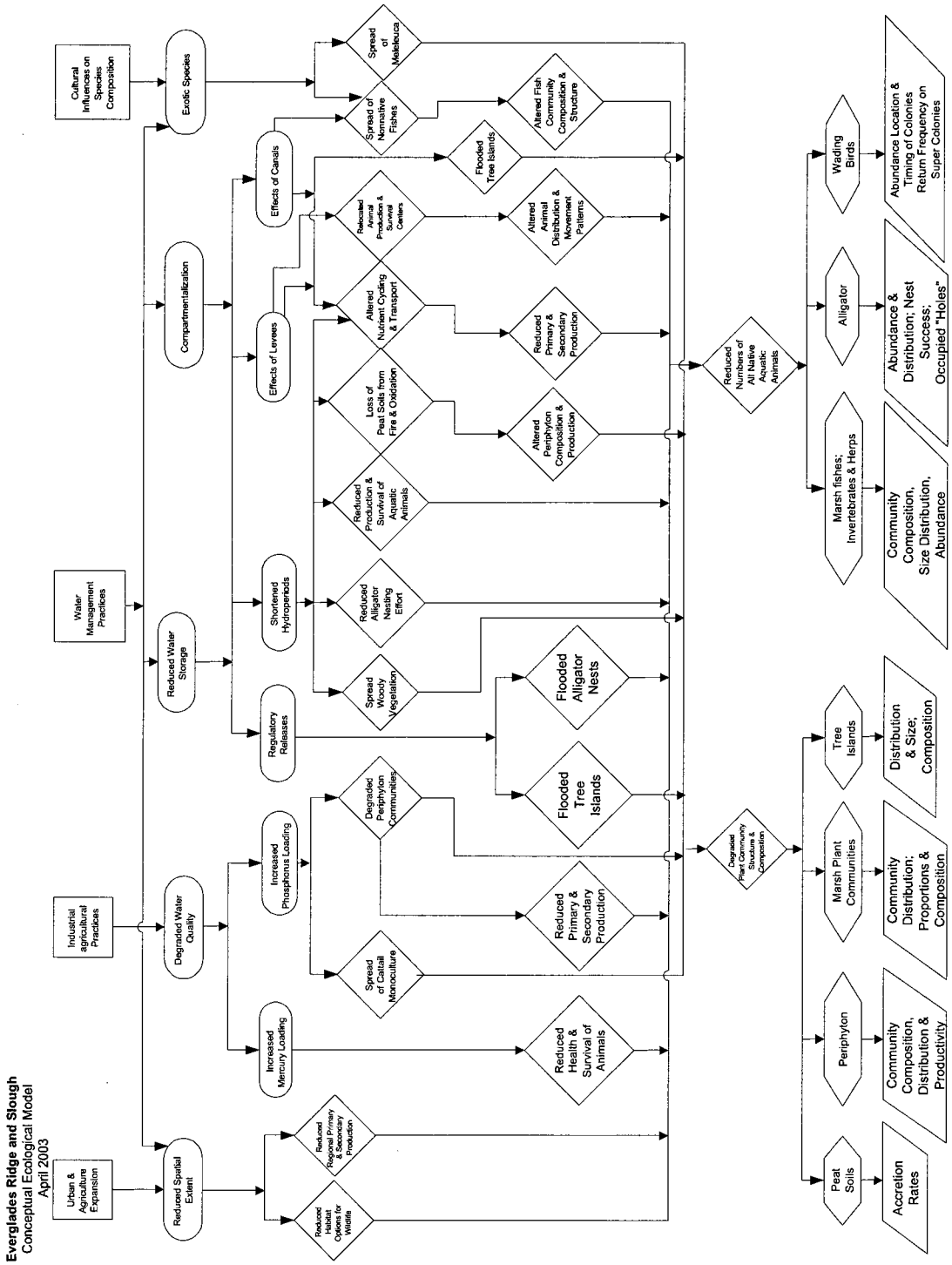


Figure A-5. Everglades Ridge and Slough Conceptual Ecological Model diagram

Figure 13. Everglades ridge-slough stressor model (CERP 2003).

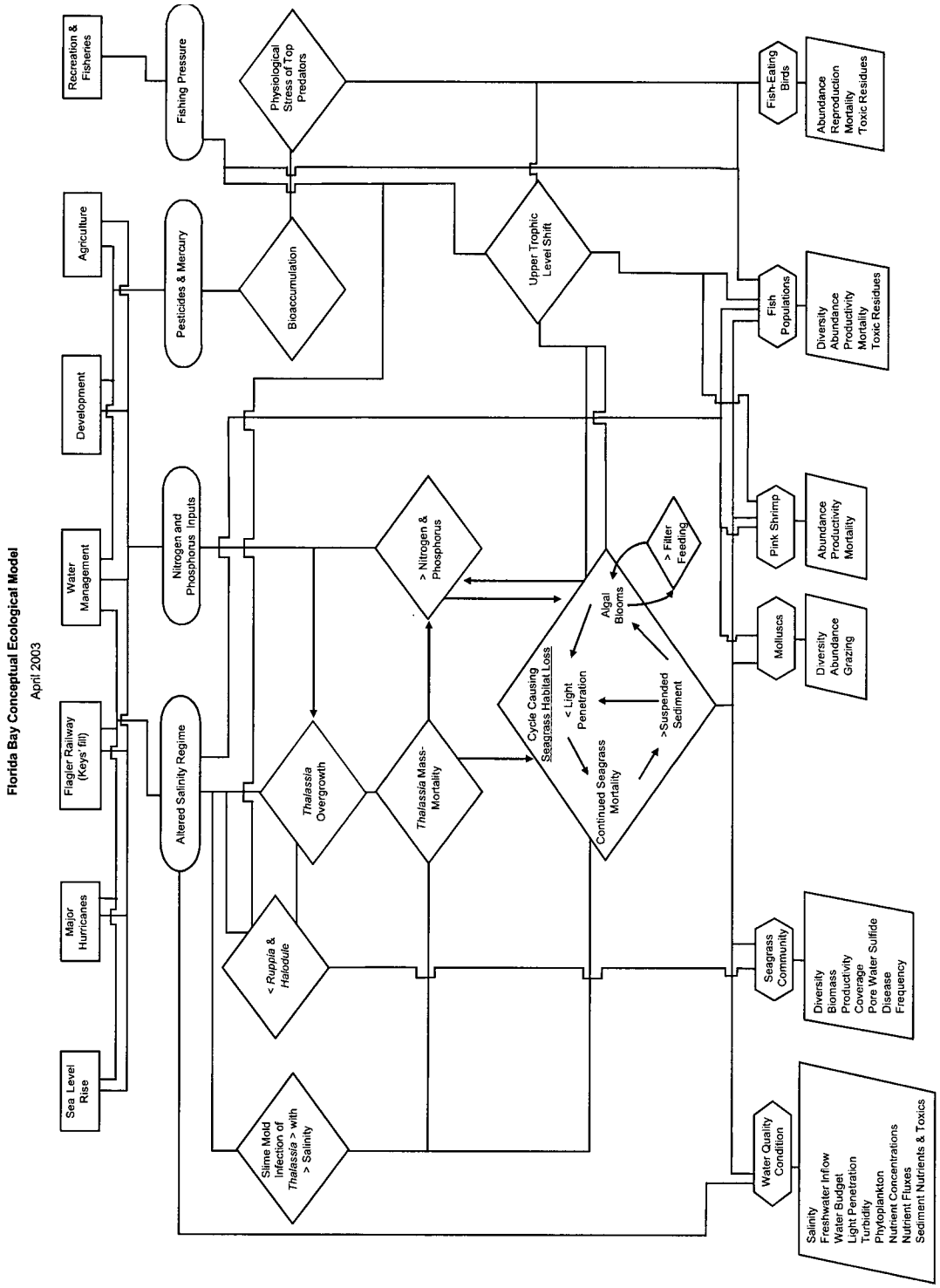


Figure A-14. Florida Bay Conceptual Ecological Model diagram

Figure 14. Florida Bay stressor model (CERP 2003).

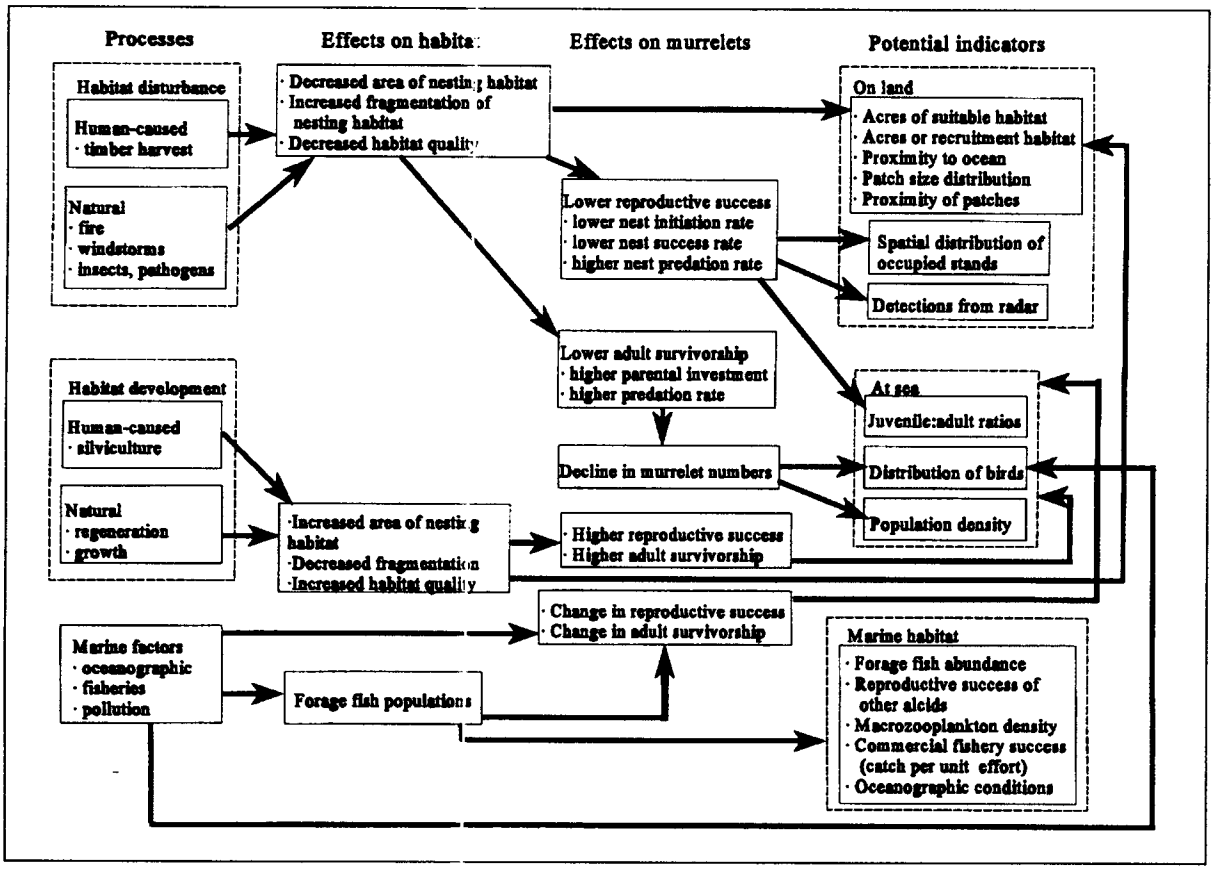


Figure 2—Conceptual model to qualitatively depict effects of environmental processes at the landscape scale on nesting habitat populations and to identify potential indicators for effectiveness monitoring.

Figure 15. Landscape level marbled murrlet model from PNW Effectiveness monitoring plan (Madsen et al. 1999).

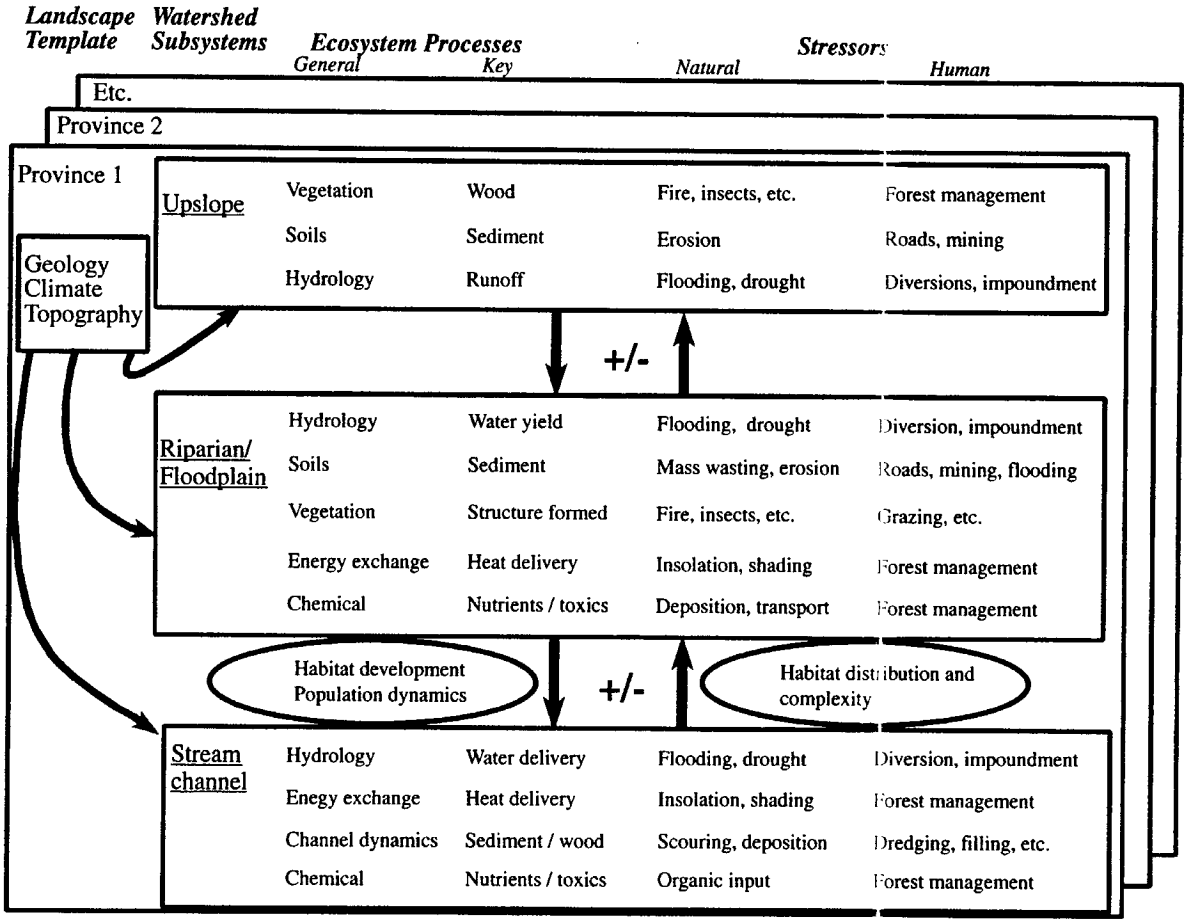


Figure 1-2. A conceptual model for monitoring the effectiveness of the Northwest Forest Plan in restoring aquatic and riparian ecosystems. Arrows indicate the direction and strength of interaction among subsystems.

Figure 16. NW Forest Plan model for aquatic and riparian ecosystems. (Busch and Trexler 2002).

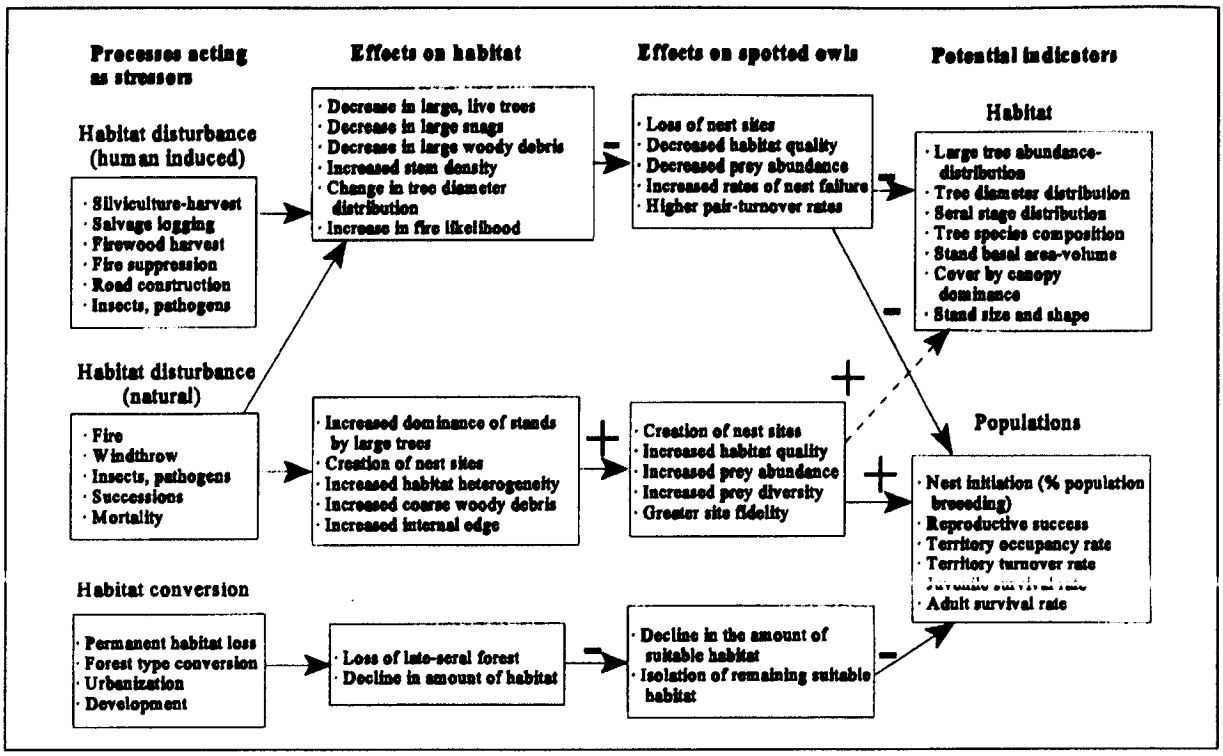


Figure 1—A conceptual model of the effects of natural and human-induced stressors on northern spotted owls at the home-range scale.

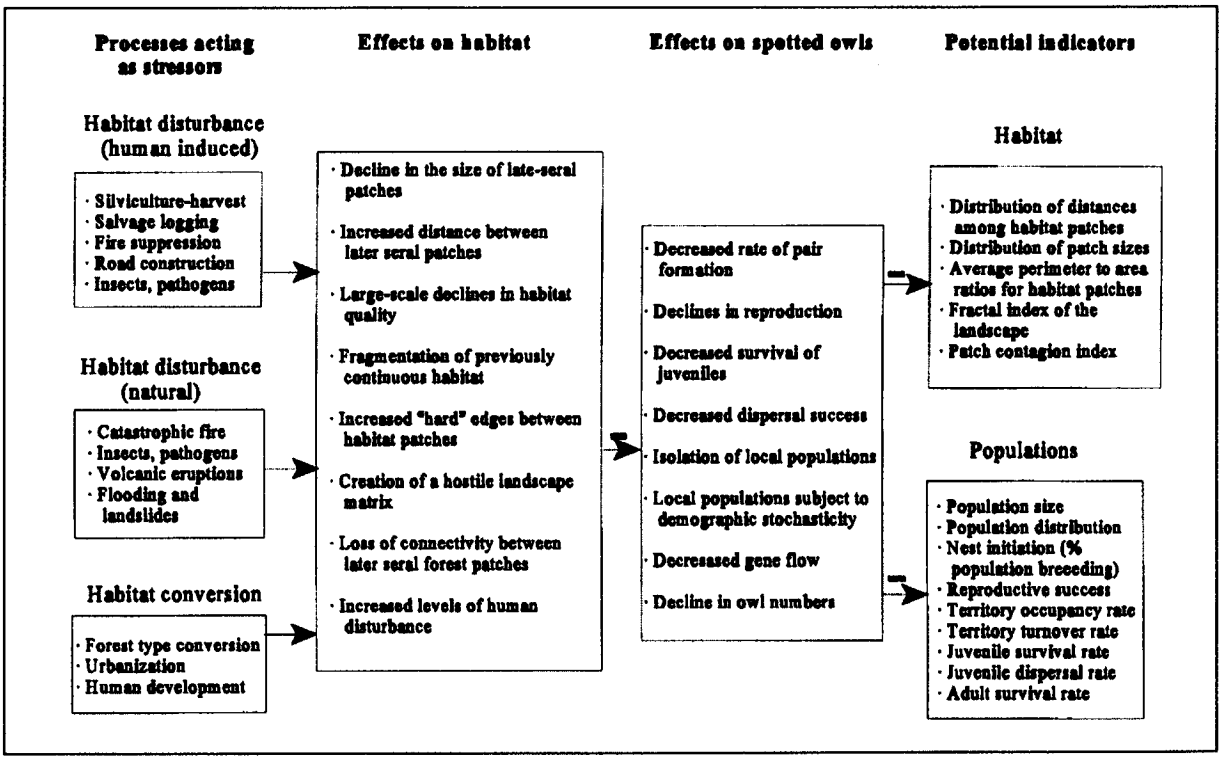


Figure 2—A conceptual model of the effects of natural and human-induced stressors on northern spotted owls at the landscape scale.

Figure 17. Spotted owl home range and landscape models. (Lint et al. 1999).

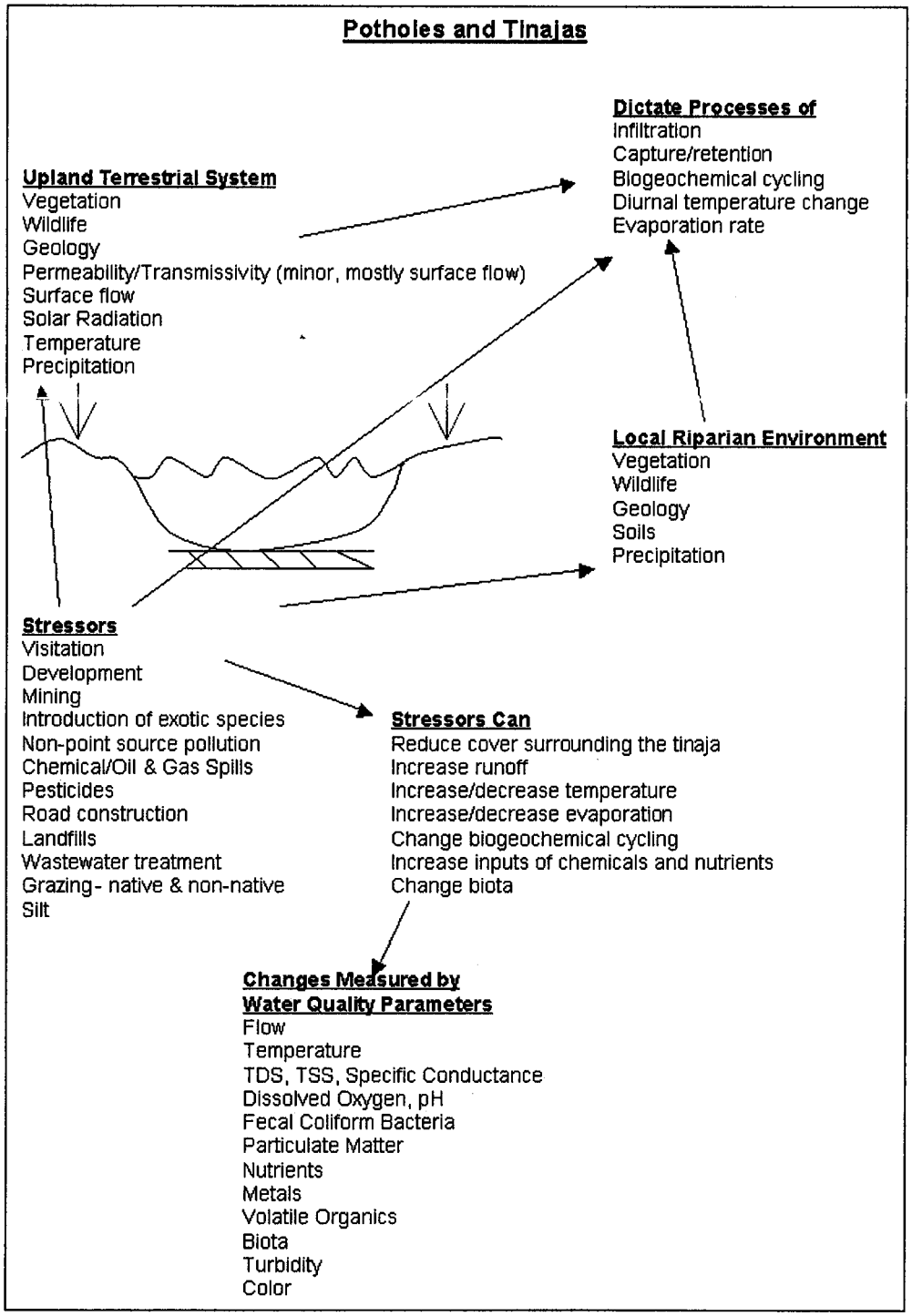


Figure 25. Conceptual model illustrating mechanisms by which anthropogenic stressors can affect water quality of insular aquatic ecosystems associated with slickrock potholes, waterpockets, and tinajas (partially based on Karr and Chu 1999).

Figure 18. Potholes and tinales conceptual model (Evenden et al. 2002).

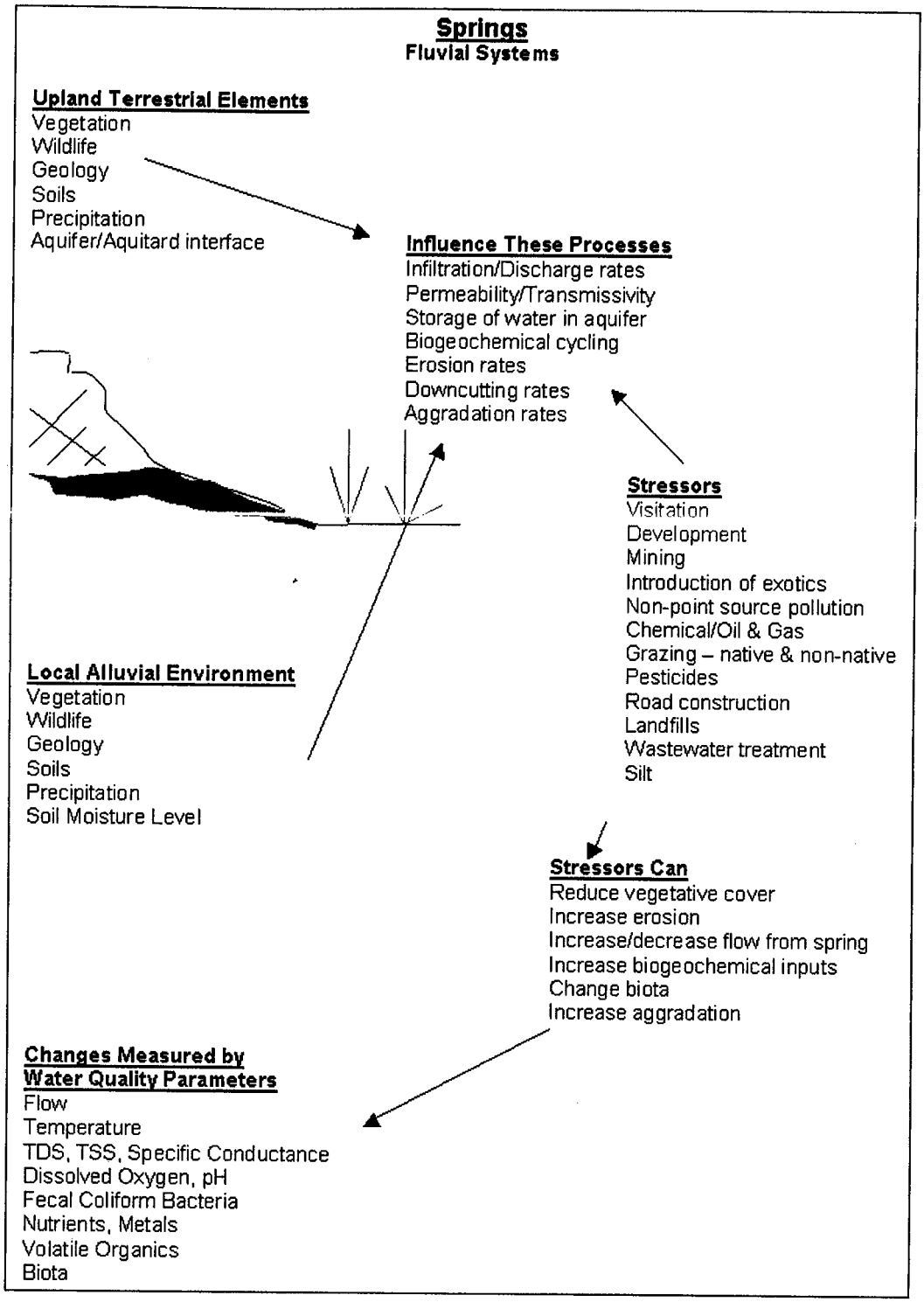


Figure 23. Conceptual model illustrating mechanisms by which anthropogenic stressors can affect water quality of aquatic ecosystems associated with springs (partially based on Karr and Chu 1999).

Figure 19. Springs conceptual model (Evenden et al. 2002).

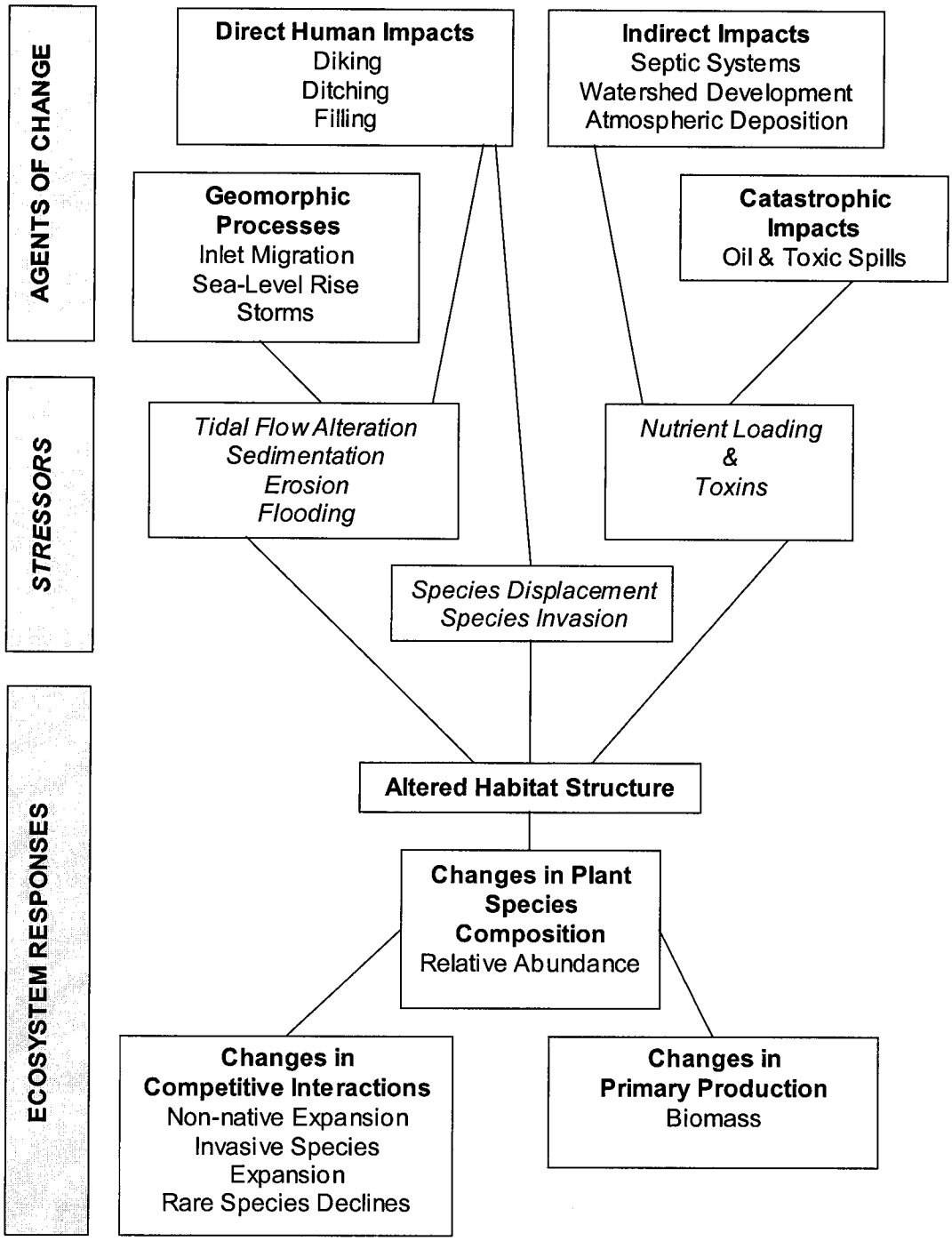


Figure 12. Conceptual model illustrating the linkages among agents of change, stressors and associated ecosystem responses in plant species composition.

Figure 20. Stressor model for plants (Stevens and Milstead 2002).