B10120 20161123

METAPOPULATIONS,
PLANT COMMUNITY COMPOSITION

POPULATION PERSISTENCE OF A
RARE BUTTERFLY IN HABITAT PATCHES

→ FENDER'S BLUE BUTTERFLY DEPENDS
ON A RARE PLANT, KINCAID'S LUPINE

→ ANNUAL PULSES OF REPRODUCTION
FOLLOWED BY HIGH LARVAL
MORTALITY

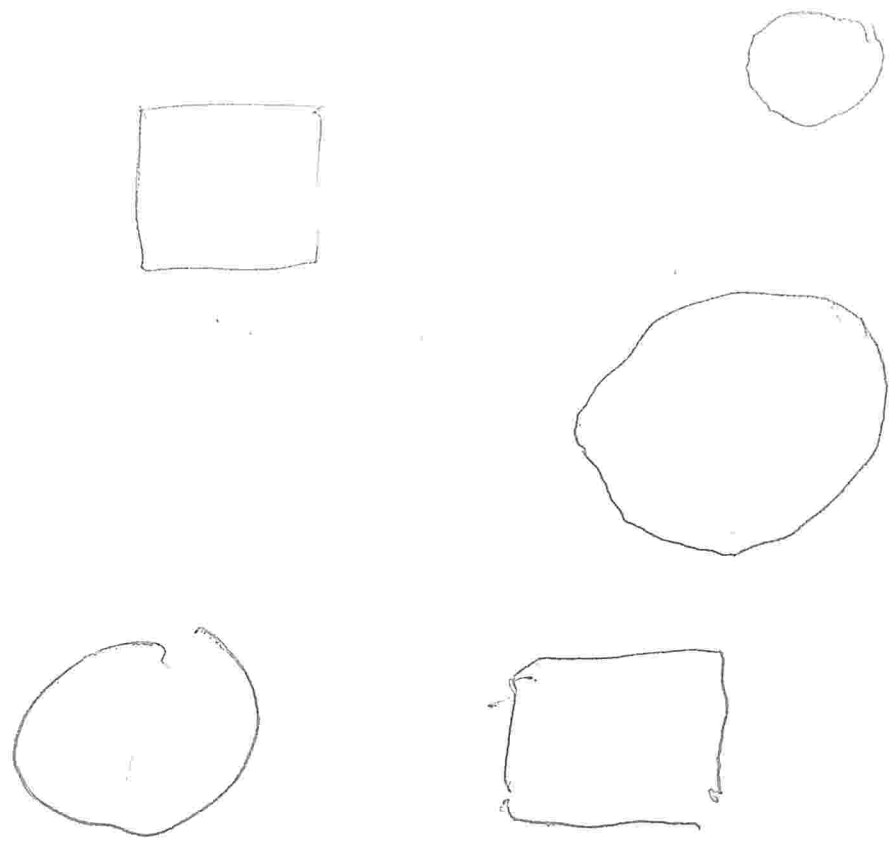
ELOBEAKER SIMULATION MODEL

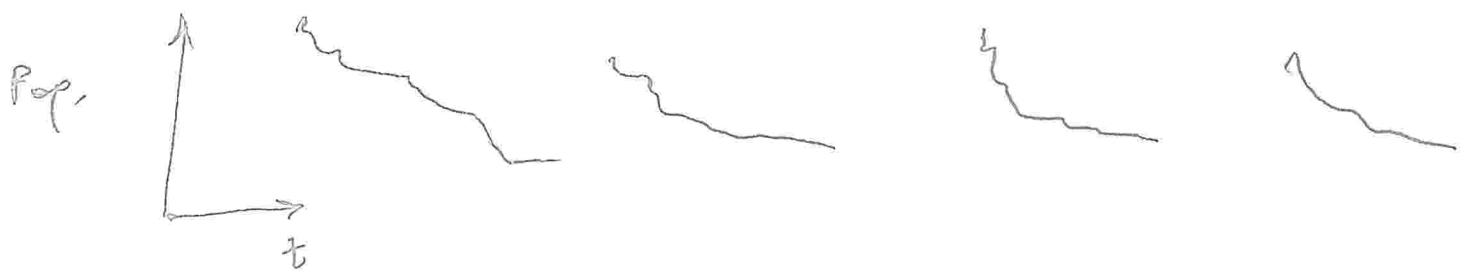
VEGETATION

PRAIRIE FAM

B.I. SURVIVES

PATCHES





BIG HABITAT PATCHES ARE CRITICAL,

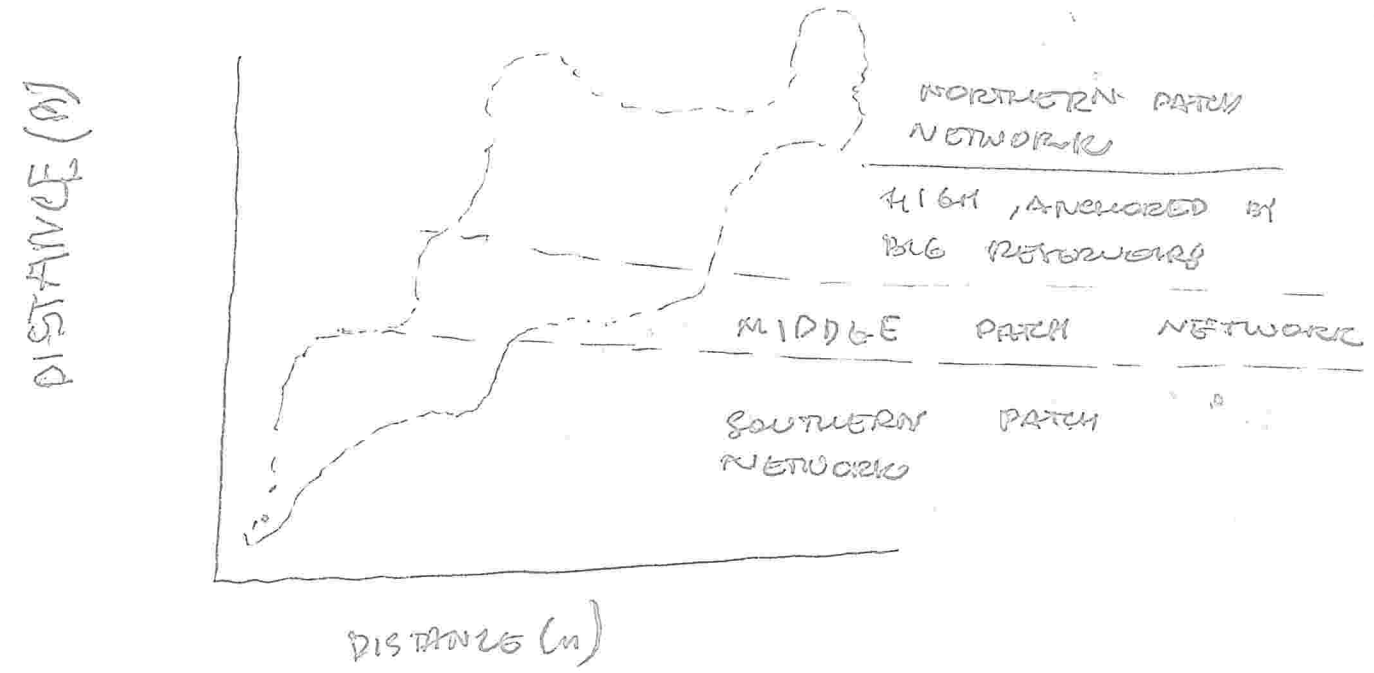
- IF THEY ARE NOT AVAILABLE,

THEN CORRIDORS ARE AN ALTERNATIVE

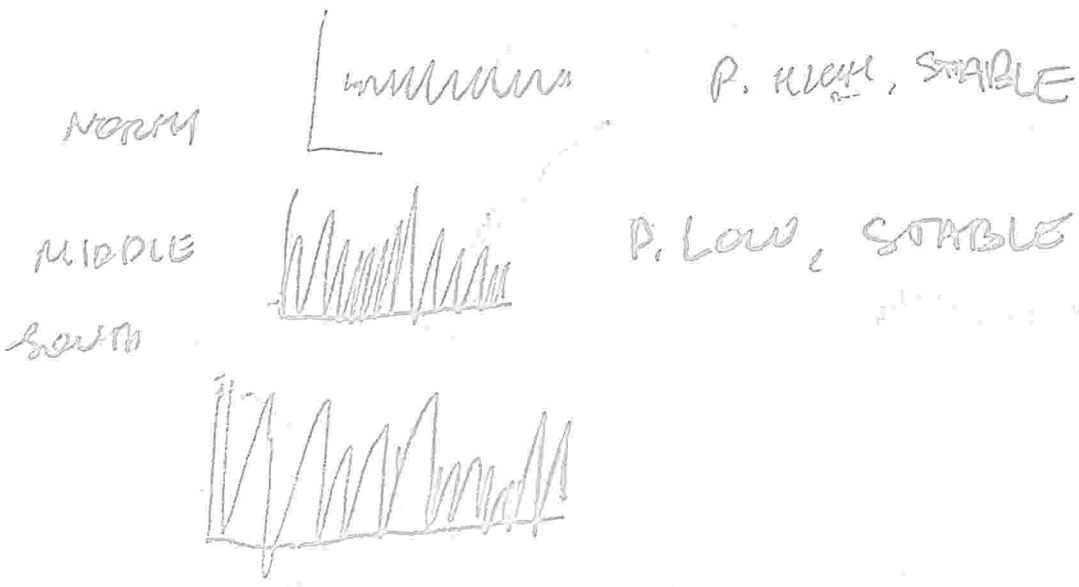
INTERDEPENDENCE OF HABITATS

TAILINGS PILES FROM HARD-ROCK MINING CREATE MANY SMALL REPLICATED PATCHES OF DRY HABITAT.

BOOTH 1988-1991,
% PATCH OCCUPANCY



COUPLING AFFECTS THE STABILITY OF THE HABITATS.



GENERAL STABILITY AND COEXISTENCE

- MODEL POPULATIONS CAN BE DRIVEN TO EXTINCTION THROUGH
  - CHAOS (STRONG DENSITY-DEPENDENCE)
  - UNSTABLE LIMIT CYCLES
  - ALLEE EFFECTS AT LOW DENSITY

BUT THEY ARE COUNTERED BY:

NON-EQUILIBRIAL CONDITIONS,
HABITAT PATCHINESS, RESCUE-BY-MIGRATION.

SOME FOCUS: FORM
MUTUAL ASSOCIATIONS.

eg. DAM-BUILDING

VIEWS ON THE CAUSES OF ASSOCIATION

ORGANISMS

TYPOLOGICAL COMMUNITY VIEW

INDIVIDUAL

DISPERSAL

REFUGING

F. CLEMENTS | ORGANISMIC

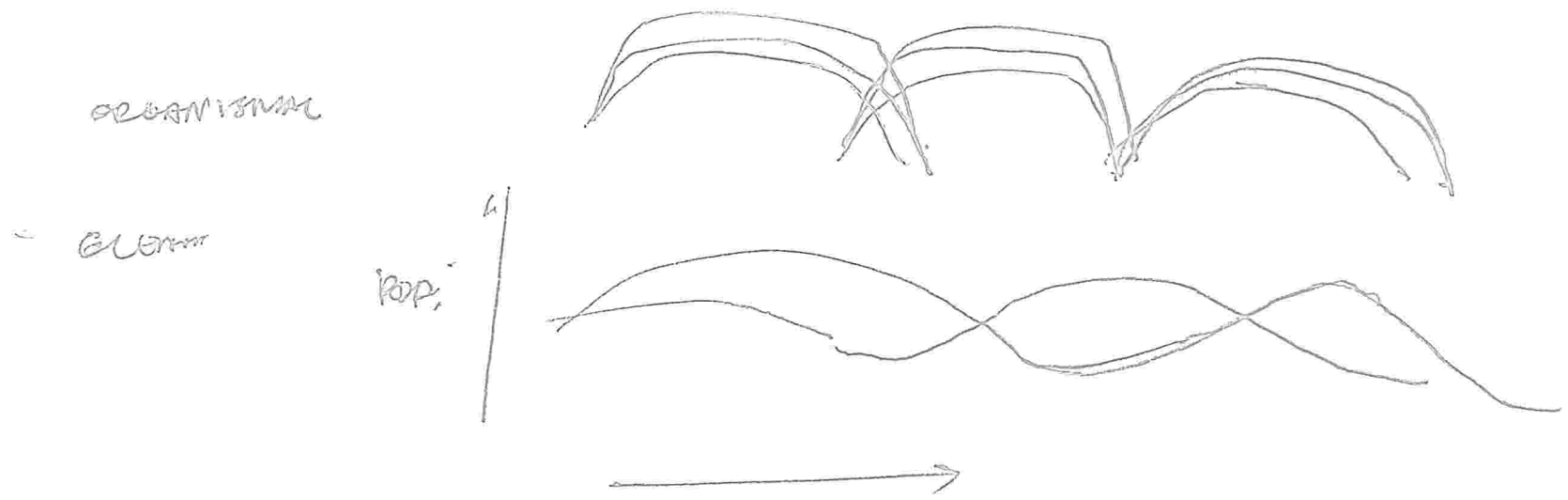
AS AN ORGANISM, THE ASSOCIATION ARISES, GROWS, MATURES AND DIES.

GLEASON | INDIVIDUALISTIC

DEPENDS ON THE MIGRATION AND OTHER REACTIONS

⟶ USE OF GRADIENT ANALYSIS!

GLEASON ↑.



⟶ CURTIS'S INDIRECT GRADIENT ANALYSIS REVEALED SAME CONCLUSION, MORE OBJECTIVELY WITH THE USE OF MULTIVARIATE STATISTICS.

COMMUNITY DYNAMICS: PREDICTABLE SUCCESSFUL CHANGE IN PLANT COMMUNITIES

- PIONEER SPECIES (≈ r-SPECIES)
- SOIL-BUILDING PROCESSES AND SHADE THOUGHT TO BE CRITICAL

CLASSIFICATIONS & TERMINOLOGY 1.

SUCCESSIONAL SEQUENCE:

STARTS WITH PIONEER SPECIES

↓ TEMPORARY / NON-EQUILIBRIUM STAGES

CLIMAX STAGE

---

a. PRIMARY SUCCESSION

BRAND NEW HABITAT IS CREATED:

→ MARINE FOUR IS EXPOSED

b. SECONDARY SUCCESSION:

PRE-EXISTING VEGETATION UNDERGOES A DISTURBANCE

SOIL DEVELOPMENT: SOLID LAVA ERODES INTO FINE PARTICLES, ORGANIC MATTER IS BUILT UP

PLANTS ATTRACT BIRDS,

HERBACEOUS PLANTS COVER GROUND, TREES GROW

TREE CANOPY CLOSES IN,

SOIL IS WELL-DEVELOPED,

SHADE IS IMPORTANT.

STAGE 1 : COLONISATION BY ANNUAL WEEDS

2 : A.W. OUTCOMPETED BY PERENNIAL WEEDS

3 : WOODY SHRUBS MOVE IN

4 : TREE SAPLINGS

5 : TREE CANOPY CLOSES IN,

SHADE BECOMES A MAIN FACTOR

6 : SHRUB LAYER DIES,

SHADE-TOLERANT UNDERSTORY ONLY.

7: ONLY SHADE-TOLERANT SPP. REMAIN,

SPECIES NUMBER IS MUCH LOW

DRIVERS OF TERRESTRIAL SUCCESSION

- SOIL DEVELOPMENT
  - → pH BUFFERING
  - → + WATER-RETAINING CAPACITY
  - → + N CONTENT
- SHADING
  - especially important in 2° succession
- SUCCESSION MAY REACH A STABLE CLIMAX CONFIGURATION.

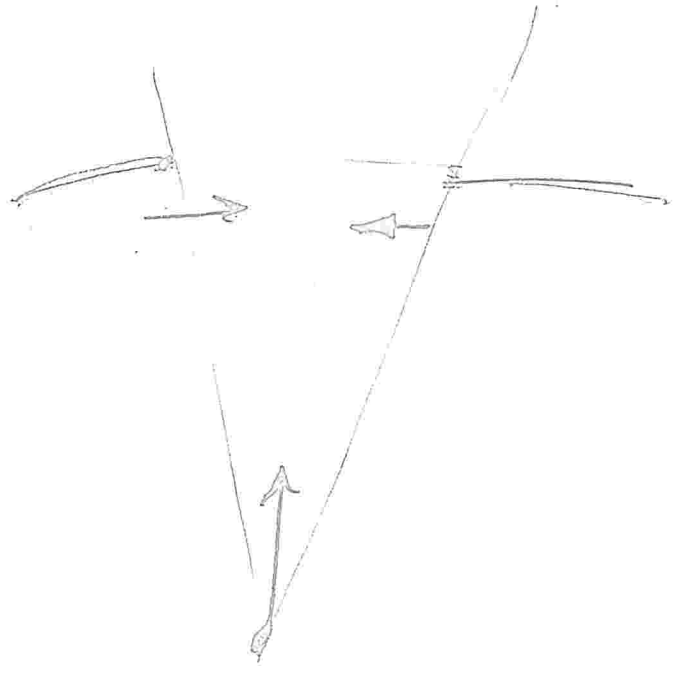
SUCCESSION WHERE NO CLIMAX-TYPE EQUILIBRIUM IS ATTAINED

- BOREAL FOREST:
  - ACID, SANDY SOILS: PINE-OAK LEAF LITTER CAN MAKE SOIL MORE ACID, NOT RICHER
- FIRE-PRONE ECOSYSTEMS AND BIOMES
- SYSTEMS DRIVEN BY SEASONALITY
- CYCLING OF DOMINANTS
- DISTURBANCE SUBSTRATES (DEATH OF A LOG)

TROPICAL RAINFOREST: VERY UNLIKELY TO BURN

→ WILL UNDERGO GAP-PHASE SUCCESSION,

LARGE BIG TREE WILL CREATE A MAJOR CANOPY GAP WHEN IT FALLS.

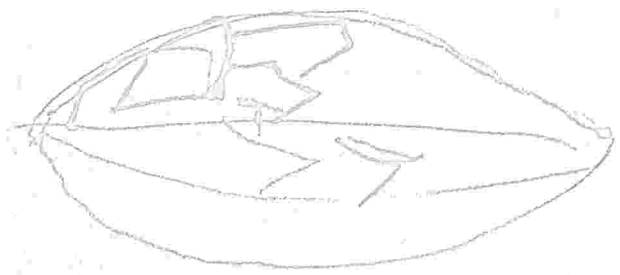


FIRE-DOMINATED COMMUNITIES:

PINE FOREST - AT A FLAMMABLE STAGE.

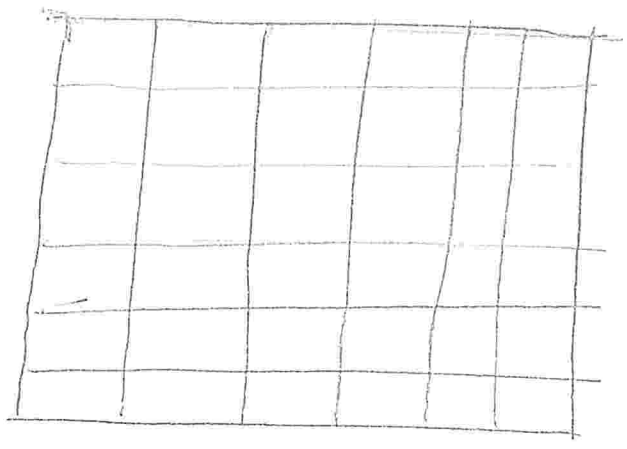
NO SHADE TOLERANT TREES, NO STABLE CLIMAX

SEROTINOUS CONES ARE A ADAPTATION TO BEING IN AFTER A FIRE



CONE SHELLS OPEN UP ON HEAT ONLY.

INTERMEDIATE DISTURBANCE HYPOTHESIS



A CELL CORRESPONDS TO A PARTICULAR SPECIES & PERHAPS UNIQUELY.

DIVERSITY INDEX:

= THE NUMBER OF SPECIES REPRESENTED