Updated Goals and Deliverables for Discussion

Goals – *modified from existing draft*

- ❑ Identify primary and secondary species for monitoring that meet CFLRP and FS needs
- ❑ Develop hypothesized species response (≈ population trends) for each 1° and 2° species
- ❑ Explicitly integrate spatial and temporal scales in species selection and sampling approach
- ❑ Establish range of monitoring options that encompass cost and rigor spectrums as needed
- ❑ Identify field sampling protocols for selected species
- ❑ Describe potential analytical methods
- ❑ Identify opportunities for collaborating entities to contribute to monitoring implementation

Deliverables – *modified from existing draft*

A final report to build from existing plan and include:

- ❑ Overview of field protocols, sampling approaches, and potential analytical approaches
- ❑ Options: balancing rigorous monitoring of 1° species and casual monitoring of 2° species
- ❑ Wildlife Team's recommendations: based on funding, rigor, public interest

Recap of Monitoring Challenges

- Variable species' response to restoration treatments / landscape condition expected
  - Treatment effects difficult to tease out from other influences on populations
  - Landscape condition impacts
- Our ability to effectively monitor varies by species
- Populations v. habitat
  - If habitat relationships well established, may be reasonable to monitor habitat only
  - Population monitoring only true metric of population trend

- Impacts of non-CFLRP activities on populations may confound pop response
  - Within CFLRP boundary- fire, hunting, recreation, etc
  - Outside CFLRP boundary- stressors during migration and seasonal habitat use,
- Hypothesis testing vs. observation (poorly phrased)

- Pitfalls of 'Type 2 Errors' in wildlife monitoring
  - Failing to observe an impact (positive or negative) when it actually occurs

Practical (?) Wildlife Monitoring Groups

Ecologically Informative

- functional groups
- PIPO specialists
- Trophic representation

Politically Prudent

- ESA listed & candidate spp.
- FS sensitive species
- State species of concern
- MIS

Economically / Socially Important

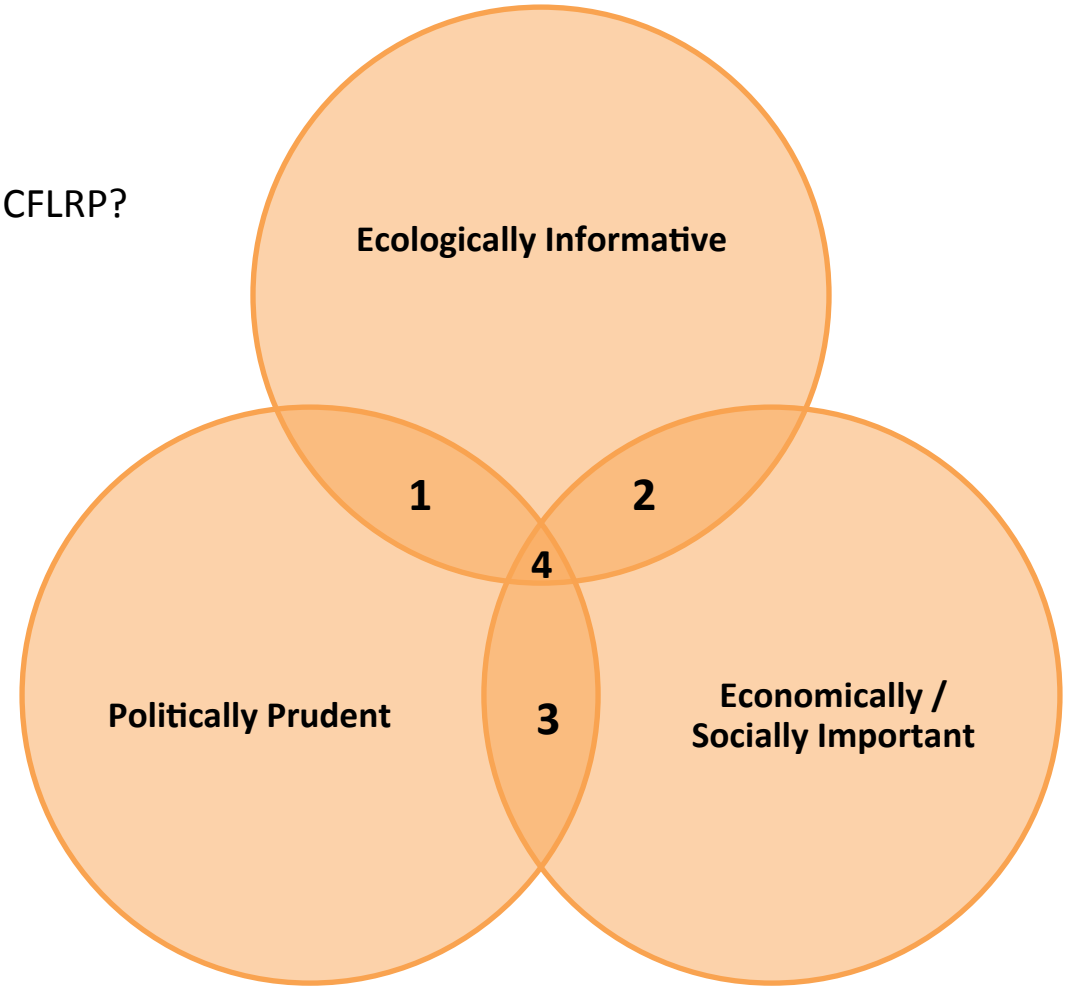
- Game species
- Watchable wildlife
- Culturally important spp.

Groups certainly not exhaustive, nor independent

Which meet the needs of the FS and CFLRP?

Meeting Multiple Objectives – Win, Win, Win?

1. CFLRP Priority?
2. Who belongs here?
3. Of key interest to FS / CFLRP?
4. Win, win, win



Suggest species that not fall into an overlap area should not be a priority for rigorous monitoring. If they can be monitored using a multi-species approach, inclusion makes sense.

Proposed Framework for Selecting Species for CFLRP Monitoring

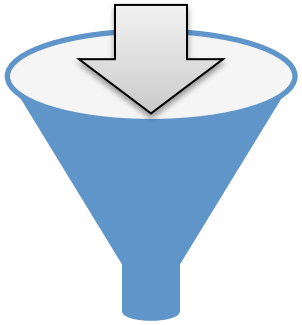
- Step 1: assign species to 'monitoring' groups
- Step 2: identify species that meet multiple objectives
- Step 3: for species that meet multiple objectives and select 'single purpose' species[NTS]:
  - identify appropriate temporal and spatial monitoring scales
  - Develop hypothesized population response to CFLRP mgmt[NTS]
- Step 4a: review sampling methods for species from step 3
- Step 4b: review existing data for species from step 3
- Step 5: identify potential stressors that may influence population trends

Species Selection Framework, cont

- Step 6: synthesize all of the above to identify potential 1˚ and 2˚species for monitoring:
  - 1˚ species should (?) be resident species whose population trends will be less influenced by off-site stressors, likely (?) to respond to CFLR treatments and / or overall landscape condition, and able to be monitored using cost-effective techniques.
  - Ideally, 1˚ species will meet multiple objectives though single-purpose species may be appropriate to meet agency / CFLRP needs.
  - 2˚ species will be (?) species that can be monitored using techniques for 1˚ species or other methods that are inexpensive; less rigor for 2˚ species may acceptable
- Step 7: for 1° species, conduct power analysis to establish sampling required to meet objectives
- Step 8: summarize costs / benefits of sampling effort for 1° species
- Step 9: make recommendations to LR team, with rationale…

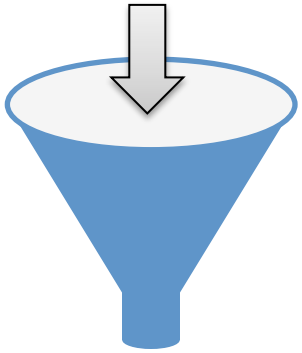
Species Selection Framework – Filtering species from a whole bunch to a practical few

Begin – 150 species



Filter 1: multiple objectives, select 'single purpose' species (Steps 1 – 3)

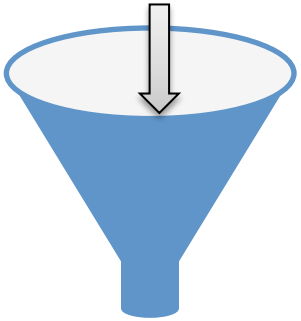
Reduced to 62 species



Filter 2: consider sampling approaches, available data, stressors

Reduced to 37.5 species

From filter 2: 37.5 species



Final Filter: Step 6: identify 1° species for monitoring consideration, as well as 2° that could be monitored coincident with 1° *NTS*

Reduced to 14 species

For Primary Species

- Power analysis or similar
- Cost / benefits of different monitoring approaches
- Make recommendations that include range of options

Why bother with 'rigorous' wildlife monitoring?

Statistical errors and hypothesis testing

Example hypothesis testing

H_o: restoration treatments will not impact Abert's squirrel populations

H_a: restoration treatments will negatively impact Abert's squirrel pops

	True H_o	False H_o
Accept H_o	Correct	Type II error
Reject H_o	Type I error	Correct

α, β, statistical Power and sample size

	True H_o	False H_o
Accept H_o	$1 - \alpha$	Type II error = β
Reject H_o	P(Type 1) = α	Power = $1 - \beta$

Avoiding Type 2 errors requires statistical power, which usually requires considerable sampling effort

Roundtable Wildlife Team—***DRAFT*** High Level Work Plan

Laundry List of ideas for inclusion – this forms the basis for team member tasks

- ❑ Restate goals, objectives, deliverables
- ❑ Articulate the challenge of selecting species
- ❑ Propose a multi-step screening procedure
- ❑ Initial Screening - Venn diagram concept based on monitoring 'groups;
  - ❑ Species in the FR PIPO can be categorized, several fall into multiple cateogies
  - ❑ Priority species: those that occur in overlap areas? Need to use a different term- priorities will be used a subset of these. But…
  - ❑ Need to consider which overlap areas meet FS / CFLRP needs
  - ❑ Species not in overlap may not be priorities? If they can be monitored with protocols targeting priority species, win win.
  - ❑ Anecdotal or less rigorous information may be useful for species not in overlap areas
- ❑ Additional considerations for 'Priority' species:
  - ❑ Hypothesized population response for each species based on the objectives of the CFLRP
    - ❑ Treatment effects?
    - ❑ Overall landscape suitability and population stability?
  - ❑ Population metrics of interest for each species
  - ❑ Monitoring protocols:
    - ❑ well-established techniques for population monitoring
    - ❑ Cost of monitoring
    - ❑ Skill level for monitoring
  - ❑ Issues of scale:
    - ❑ Spatial scale: need to establish consistent language that ties closely to that being used by CFRI's Front Range GTR group. Scales in terms of veg aggregation as they may relate to wildlife behavior
    - ❑ Temporal scale: monitoring periodicity presumably varies based on life history (i.e., not necessary to monitor all species every year).
  - ❑ Availability of existing data
- ❑ Possibility of a '2-tier' monitoring approach
  - ❑ Priority species where rigor is needed
  - ❑ Additional species that can either be monitored through techniques for a priority species (E.g. bird monitoring protocol), or species where rigor less critical and anecdotal evidence is adequate?)