Multi-species Baseline Initiative
Project Report: 2010-2014

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Coeur d'Alene, Idaho

Multi-species Baseline Initiative Partner Organizations

A Division of Hancock Timber Resource Group,
A Manulife Asset Management Company

Multi-species Baseline Initiative Funding Organizations

MBI OVERVIEW. Multi-species Baseline Initiative

Preface

All I ever really wanted from life was to be a dirtbag field biologist. As it turned out, as long as I was willing to forgo money, comfort, and a personal life, it wasn't that hard to pull off. I was beside myself with excitement when I got my first job after college working with mountain lions. By University of Utah requirements, I was paid minimum wage for 40 hours per week. By requirement of my graduate student supervisor, I 'volunteered' an additional 40 for the lions. And so my career went. Spotted owls, bald eagles, deer mice, wolves...I dove in and worked hard. One species at a time.

This was a great way to live but I began wondering if it might be possible to manage wildlife more efficiently. My opportunity came when the Idaho Panhandle National Forest partnered with us on a wolverine survey. By choosing a multi-species survey method, we were able to collect solid data on many data-deficient species, not just the one.

Back then, when we had a hard day, we would borrow from Doug Chadwick's description of the pine-cone-shitting-badass and say we were doing things the 'Wolverine Way'. As our project grew, our 'Wolverine Way' morphed into the 'MBI Way'.

At first, the MBI Way referred to perseverance and suffering - mostly in the field. And there was certainly plenty of bushwhacking and frozen beaver hauling to go around. But the hardest parts of this project happened far from the field and looking back over the last 6 years, I realize now the MBI Way is much more than hard field work. From learning completely new (to me) taxonomic groups to trying out citizen science the MBI Way required not just visiting the area outside of my comfort zone, but *living* there. In the end, it pushed me to be a better biologist and broadened my perspective to think about ecosystems rather than species.

As MBI comes to a close, I've finally realized the MBI Way is really about growing out of being a biologist focused on a single species and becoming an ecologist studying the bigger picture. I hope this project inspires other dirtbag field biologists to become ecologists too.

Michael Lucid
16 September, 2016
Bonners Ferry, Idaho

Project Summary

The occurrence data required to develop the species of concern lists which drive many conservation programs are usually not available. This forces practitioners to develop and implement conservation actions without accurately assessing conservation need. We are left with a conservation system which is assumption based rather than data driven. Often modeled, but rarely measured, the data necessary to appropriately inform adaptive natural resource management may seem too difficult to obtain, but they are within reach.

Our tradition of single species management is a primary reason these data are not available but attempting to inventory wildlife one species at a time is akin to trying to understanding the galaxy with a pair of binoculars. Even when projects do encompass multiple species, the focus rarely extends beyond class. The path forward requires inventory and monitoring programs that maximize field survey resources to effectively encompass multiple broad taxonomic groups in single field efforts.

Complicating matters, climate change is increasing the rate of ecosystem composition change and it is unclear what capacity wildlife may possess to adapt. A minimum of 2 data types are necessary to develop wildlife management actions in the context of climate change: 1) species occurrence and 2) species climate requirements. Accurate sets of either of these data types are unavailable for almost all species. This presents an urgent problem which cannot be solved on a per species basis. Thoughtfully designed and implemented inventory programs that target multiple taxonomic groups and their climatic requirements are needed over large spatial scales.

To begin addressing this need in northern Idaho and adjoining mountain ranges, we selected 19 Species of Greatest Conservation Need (SGCN) which were identified by the 2005 Idaho or Washington State Wildlife Action Plans (SWAP) as "lacking essential information." We used this multi-taxa group of amphibians, forest carnivores, and terrestrial gastropods as the centerpiece of an inventory designed to collect data on baseline occurrence and micro-climatic associations for 182 species of animals and plants.

Our study area centered on the Panhandle Administrative Region of the Idaho Department of Fish and Game (IDFG), but also included portions of Washington, Montana, and British Columbia. We overlaid a grid on our 22,975km^2 study area which divided it into 920 5x5 km cells. We conducted surveys for terrestrial gastropods, pond breeding amphibians, and/or forest carnivores and their associates at 2,315 survey sites stratified within the cells. We co-located 1,169 micro-climate data loggers with wildlife survey sites where we collected 1-4 years of air or water temperature data.

Our central funding source was a $950,000 Competitive State Wildlife Grant and we were awarded 5 additional federal grants. We leveraged over 1 million dollars in non-federal matching funds which included 2 non-federal grants but was largely partner contributions. Our total budget was 2.6 million dollars. We built a coalition of 18 partner groups representing state, tribal, and federal agencies, universities, non-governmental organizations, and private corporations. Our partners enabled over 500 individual people, including about 200 volunteer citizen naturalists, to contribute to various aspects of the project.

Together, we demonstrated the feasibility of collecting a regional multi-taxa species occurrence dataset along with survey site level micro-climate measurements. Our micro-climate inventory identified species which may be cool air associates and pinpointed areas which could be used as cool air conservation reserves. Our species occurrence data changed our understanding of the distribution and abundance for each target species. Vertebrates tend to be less well distributed than previously thought and most invertebrates were more abundant and more widely distributed than previously thought. Without this inventory, management actions developed for our target species would have been based on incorrect assumptions.

Data driven adaptive management is needed but is only achievable when adequate data collection tools are in place. The time frame is too short for single species inventories to realistically provide the information we need to manage wildlife during climate change. Through partnerships and thoughtful study design, we leveraged a workforce of hundreds to implement SWAP identified actions within a multi-taxa inventory framework. We called our project the Multi-species Baseline Initiative and from 2010-2014 we set forth into northern Idaho's mountains, forests, and swamps with one simple goal: to see what's out there...

Key Findings

- Standardized surveys at 2,315 sites detected 182 species.
- From 2005 to 2015 the mean NatureServe Idaho subnational conservation status rank (S-rank) of target species increased by 1.4 (Table 1-1).
- From 2005-2015 our understanding of landscape level species occurrence changed for each of the 19 target SGCN (Table 1-2).
- From 2005 to 2015 the mean Idaho S-rank of target invertebrate increased by 2.3 (Table 1-1, 1-3).
- From 2005 to 2015 mean Idaho S-rank of target vertebrates decreased by 0.4 (Table 1-1, 1-3).
- Invertebrate status tended to increase with additional survey effort and vertebrates either stayed the same or decreased slightly.

Table 1-1. Mean NatureServe Idaho subnational conservation status rank (S-rank) changes from 2005-2015. SH (possibly extinct) = 0, SNA/R (Species Not Applicable/Ranked) = removed from calculation

	2005	2015	Change
Invertebrates (*n* = 10)	1.4	3.7	+2.3
Vertebrates (*n* = 5)	2.6	2.2	-0.4
All Species	1.8	3.2	+1.4

- *Cryptomasitx mullani blandi*: We provide evidence this trinomial should never have been considered a distinct taxonomic unit.
- *Cryptomastix sanburni* and *Magnipelta mycophaga*, both considered possibly extinct (SH) in 2005, were detected at multiple sites.
- Evidence supporting a new species of *Hemphillia* is provided.
- Wood frogs (*Rana sylvatica*) were never extant in Idaho.
- Northern leopard frogs (*Rana lithobates*) are native to northern Idaho and appear to be extirpated.
- Western toads (*Anaxyrus boreas*) within the study area are appropriately taxonomically classified.
- Western toads were more abundant in the Selkirks than other portions of the study area.
- Tiger salamanders (*Ambystoma tigrinum*) were likely never extant in northern Idaho.
- Chytrid fungus (*Batrachochytrium dendrobatidis*) is widespread at low concentrations across the study area.
- We detected 46 individual fishers (25 males, 20 females, 1 unknown gender).
- Fishers (*Pekania pennanti*) are more abundant in the West Cabinet Mountains than the remainder of the study area.
- The 'native' fisher Haplotype 12 was not detected.
- 5 individual (2 male, 3 female) Canada lynx (*Lynx canadensis*) were detected.
- 3 individual male wolverines were detected.
- Arboreal mammal species richness, particularly American marten (*Martes americana*), is lowest in the Coeur d'Alene Mountains.

- Mean 2013 annual air temperature of survey sites in was 6.17°C.
- Mean 2013 annual wetland water temperature was 5.88°C.
- A cool air refugium is identified in the Selkirk Mountains.
- Four terrestrial gastropods are associate with cooler than average mean air temperatures.
- The majority of terrestrial gastropods are found across a wide range of mean air temperatures.
- Most target 'rare' terrestrial gastropods were relatively abundant with 4 of the 8 most commonly detected gastropods being target 'rare' species (Fig. 1-1).

Table 1-2. Differences in target species status within study area before and after MBI survey.

Common Name	Pre-MBI Status	MBI Survey Results
Gastropods		
Thinlip Tightcoil (*Pristiloma idahoense*)	Critically imperiled[a]	Relatively common and well distributed
Lyre Mantleslug (*Udosarx lyrata*)	Critically imperiled[a]	Relatively common with restricted range
Pale Jumping-slug (*Hemphillia camelus*)	Imperiled[a]	Relatively common and well distributed
Pygmy Slug (*Kootenai burkei*)	Imperiled[a]	Common and well distributed
Humped Coin (*Polygyrella polygyrella*)	Imperiled[a]	Locally common with limited distribution
Smoky Taildropper (*Prophysaon humile*)	Imperiled[a]	Common and well distributed
Fir Pinwheel (*Radiodiscus abietum*)	Imperiled[a]	Common and well distributed
Sheathed Slug (*Zacoleus idahoensis*)	Imperiled[a]	Common and well distributed
Blue-gray Taildropper (*Prophysaon coeruleum*)	Occurs in study area[b]	Uncommon with restricted range
Kingston Oregonian (*Cryptomastix sanburni*)	Possibly extinct[a]	Locally abundant with limited distribution
Magnum Mantleslug (*Magnipelta mycophaga*)	Possibly extinct[a]	Widespread with patchy distribution
An Oregonian (*Cryptomastix mullani blandi*)	Critically imperiled[a]	Inappropriate taxonomic designation
Amphibians		
Wood Frog (*Rana sylvatica*)	Possibly extinct[a]	Never extant
Northern Leopard Frog (*Lithobates pipiens*)	Possibly extinct[a]	Presumed extinct
Western Toad (*Anaxyrus boreus*)	Widely distributed[c]	Locally abundant but poorly distributed
Tiger Salamander (*Ambystoma tigrinum)*	Unverifiable historic detections[d]	Likely not native and currently not extant
Mammals		
Wolverine (*Gulo gulo*)	All modeled habitat occupied[e]	Little modeled habitat occupied
Canada Lynx (*Lynx canadensis*)	Occasional individuals[f]	Resident individuals
Fisher (*Pekania pennanti*)	Few well distributed individuals[fg]	Locally abundant but poorly distributed

[a] IDFG 2005
[b] Ovaska et al. 2004
[c] Groves et al. 1997
[d] Slater 1937 and IFWIS, accessed April 3,2016
[e] USFWS 2013
[f] Albrecht and Heusser 2009
[g] Knetter and Hayden 2008

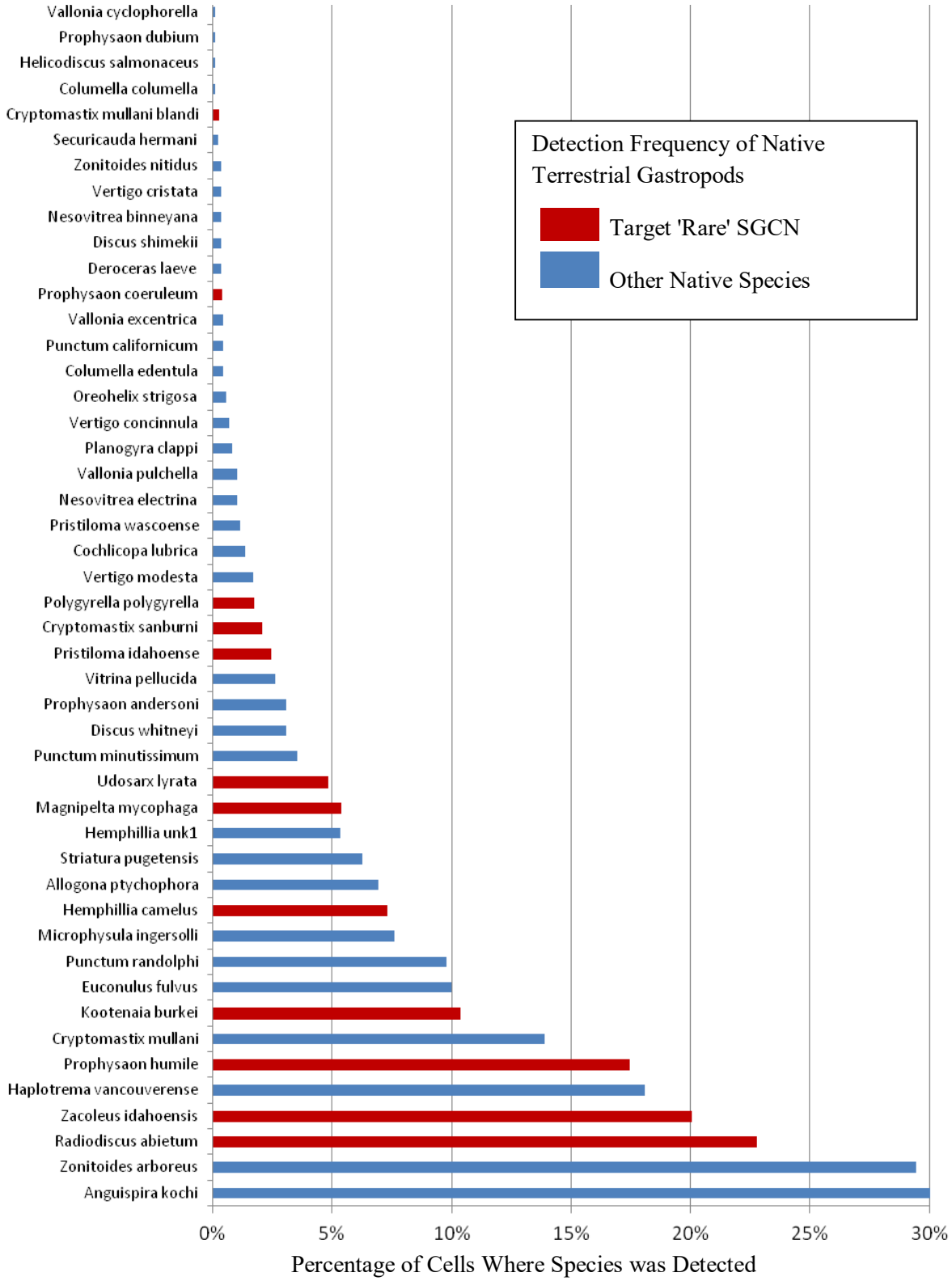

Figure 1-1. Percentage of surveyed cells (n = 879) where target 'rare' and other native terrestrial gastropods were detected.

Table 1-3. Target SGCN 2005 and 2015NatureServe Idaho subnational conservation status rank conservation status rank (S-rank) and Idaho SGCN status.

Common Name	2005 ID S-rank	2015 ID S-rank	2005 ID SGCN	2015 ID SGCN
Gastropods				
Thinlip Tightcoil (*Pristiloma idahoense*)	S1	S4	Y	N
Lyre Mantleslug (*Udosarx lyrata*)	S1	S3	Y	N
Pale Jumping-slug (*Hemphillia camelus*)	S2	S2	Y	Y
Pygmy Slug (*Kootenai burkei*)	S2	S5	Y	N
Humped Coin (*Polygyrella polygyrella*)	S2	S4	Y	N
Smoky Taildropper (*Prophysaon humile*)	S2	S4	Y	N
Fir Pinwheel (*Radiodiscus abietum*)	S2	S5	Y	N
Sheathed Slug (*Zacoleus idahoensis*)	S2	S5	Y	N
Blue-gray Taildropper (*Prophysaon coeruleum*)	SNR	S1	N	Y
Kingston Oregonian (*Cryptomastix sanburni*)	SH	S3	Y	Y
Magnum Mantleslug (*Magnipelta mycophaga*)	SH	S2	Y	Y
An Oregonian (*Cryptomastix mullani blandi*)	SNR	SNA	Y	N
Amphibians				
Wood Frog (*Rana sylvatica*)	SH	SNA	Y	N
Northern Leopard Frog (*Lithobates pipiens*)	S2	S2	Y	Y
Western Toad (*Anaxyrus boreus*)	S3	S2	N	Y
Tiger Salamander (*Ambystoma XX)*	S5	S4	N	N
Mammals				
Wolverine (*Gulo gulo*)	S2	S1	Y	Y
Canada Lynx (*Lynx canadensis*)	S1	SNA	Y	N
Fisher (*Pekania pennanti*)	S1	S2	Y	Y

S1: Critically Imperiled, S2: Imperiled, S3: Vulnerable, S4: Apparently Secure, S5: Secure, SH: Possibly Extinct, SNR: Species Not Ranked, SNA: Species Not Applicable

Acknowledgements

Partnerships were the foundation of this project and 18 organizations worked together (Table 1-4) to form the collaborative which was MBI. We thank employees of the following organizations for field assistance: Bureau of Land Management, Coeur d'Alene Tribe of Indians, Grylloblatta Ecological Consulting, Idaho Department of Lands, Idaho Panhandle National Forest, Kalispel Tribe of Indians, Seepanee Ecological Consulting, and Washington Department of Fish and Wildlife. We are grateful for collaboration with the British Columbia Ministry of Forests, Lands, and Natural Resource Operations. We thank Friends of Scotchman Peaks Wilderness, Idaho Conservation League, and Selkirk Outdoor Leadership and Education for facilitating the field work of hundreds of volunteer citizen naturalists. We thank the State of Idaho's Office of Species Conservation for their guidance and participation. We thank Potlatch Corporation, Hancock Forest Management, and over 100 other business and private individuals for allowing access to privately held land. Wildlife Genetics International performed outstanding laboratory work. Technical specialists provided essential assistance with a variety of technical analyses and questions. We are grateful to the journalists who provided excellent media coverage over the course of the project. We thank the many Idaho Department of Fish and Game (IDFG) employees who provided administrative, technical, and field assistance and the multiple IDFG wildlife technicians and interns for perseverance in the face of adversity. There was incredible interest and enthusiasm in participating in MBI and we are humbled by the nearly 500 individuals representing over 30 organizations who stepped up to contribute to this project. Thank you.

Table 1-4. MBI Partner Organizations

MBI Partner
Bureau of Land Management
British Columbia Ministry of Forests, Lands, and Natural Resource Operations
Coeur d'Alene Tribe of Indians
Friends of Scotchman Peaks Wilderness
Hancock Forest Management
Idaho Conservation League
Idaho Department of Lands
Idaho Department of Fish and Game
Kalispel Tribe of Indians
Idaho Office of Species Conservation
Idaho Panhandle National Forest
Potlatch Corporation
Selkirk Outdoor Leadership and Education
University of Idaho
University of Washington Climate Impacts Group
US Fish and Wildlife Service
US Forest Service Rocky Mountain Research Station
Washington Department of Fish and Wildlife

Table 1-5. Individual MBI contributors organized by affiliations. *Italicized names* indicate individuals who represented more than one group. Apologies for inadvertent omissions.

Arrowsandbullets.com	**ID Office of Species Conservation**	**Montana Fish Wildlife and Parks**	**U. of Idaho**
Mark Ullrich	Dustin Miller	Chris Hammond	Dr. Edward Bechinski
British Columbia MFLNO[a]	Jon Beals	Jim Williams	Dr. Steve Cook
John Krebs	**ID Panhandle National Forest**	**MT Natural Heritage Program**	Dr. Anahi Espindola
Garth Mowat	Lydia Allen	Bryce Maxwell	Dr. James "Ding" Johnson
Bureau of Land Management	Linda Berndhart	**Natural History Museum of LA Co.**	*Laine Smith*
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Gem Vision Productions	Becky Kramer	Doris Hausleitner	Annemarie Prince
Scott Rulander	**Kalispel Tribe of Indians**	**San Diego Zoo Amp. Disease Lab.**	Kevin Robinette
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Robert Funk	John Novak	Not named due to minor status (<18)	Renee Prive
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Patrick Seymour	Steve Johnsen	Kelli Van Norman	Leanne Harris
Laughing Dog Brewery	Mandy Rockwell	**UCLA**	**Vital Ground**
Fred Colby		Dr. Bradley Shaffer	Ryan Lutey

[a]Ministry of Forests, Lands and Natural Resource Operations

[b]Interagency Special Status / Sensitive Species Program Operations

Table 1-5 (continued). Individual MBI contributors organized by affiliations. *Italicized names* indicate individuals who represented more than one group. Apologies for any inadvertent omissions.

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Conrad Lahr
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Lorenzo Elias
Dave Klaw
Tom Price
Gary Whitney

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Hunter Beatty
Micah Beatty
Desiree Bardro
Zoe Bardro
Christie Boyd
Stephen Boyd
Dennis Braun
Kelsey Brasseur
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Karen Lamb
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Austin Leonard
Josh Leonard
Shaun Leonard
Jethro Runco
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Dennison Webb
Janet White
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Kerry White
John Albi
Daniel Haley
Sandpoint Charter School

Table 1-5 (continued). Individual MBI contributors organized by affiliations. *Italicized names* indicate individuals who represented more than one group. Apologies for any inadvertent omissions.

Friends of Scotchman Peaks Wilderness

FSPW Staff	***FSPW Volunteers***	***FSPW Volunteers***	***FSPW Volunteers***	***FSPW Volunteers***
Kelsey Brasseur	Bob Lizotte	Eric Grace	Jacob Styer	Florence Lamothe
Sandy Compton	Randi Lui	Jake Hagadone	Kyle Tucker	Lindsey Larson
Phil Hough	Ron Mamajek	Miles Hansen	Victoria Wagner	Ciara Legato
FSPW Volunteers	Irv McGeachy	Susan Harbuck	Sandy Wall	Micheal Lowry
Lora Adams	Jim Mellen	Joa Harrison	Mark Waters	David Lux
Jody Aslett	Alan Millar	Jamie Heckmann	Neil Wimberley	Kieri McCommas
Wendy Bachman	Jason Munske	Cody Higgins	Gonzaga University	Sandii Mellen
Brian Baxter	Rebecca Osburn	Pat Hoyle	Dennis Aslett	Ron Memajek
Chris Boeckman	Cassidy Palmer	Katey Huggler	Seth Bachman	Eric Morris
Kristina Boyd	Gary Payton	Christine Hutchison	Rod Barcklay	Howard Nusbaurn
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Holly Clements	Michael Proctor	Kristine Kramer	Leah Breidinger	Jason Pesce
Mark Cuchran	Carl Rantzow	Chris Lambiotte	John Burkhart	Liz Piatkowski
Phil Degens	Cody Reynolds	Sandy Lange	Mariah Christenson	Laurel Presser
Emily Downing	Dennis Rieger	Mac Lefebvre	Boulder Creek Academy	Kassia Randzio
Pam Duquette	*Scott Rulander*	Brian Logan	*Kevin Davis*	Mark Remmeter
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John Hagadone	Christian Thompson	John Monks	Mary Franzel	Toby Spribille
Zach Hagadone	Lisa Veniscofsky	Mike Murray	Will Glenn	Mark Stockwell
John Harbuck	Kate Walker	Jake Ostman	Chuck Gross	Joe Sweeny
Isaac Harrison	Jan Wasserburger	Tim Patton	Perky Smith-Hagadone	Justin Urbantas
John Hastings	Jeff Wiley	Jeff Pennick	Brad Hanson	Erick Walker
Carolyn Hidy	Denise Zembryki	Matthew Phillipy	Nate Harrell	Steve Wall
City School	KC Chisley	Zack Porter	Geoff Harvey	Lex Whinery
Brett Hubbard	Mark Cochran	Jodi Prout	Hannah Hernandez	Annette Wimberley
Deborah Hunsicker	Kari Dameron	Rachel Reckin	Lloyd Hixson	
Stephen Johnson	Melissa Demotte	Rebecca Reynolds	Genny Hoyle	
Andrew Klaus	Susan Drumheller	Tom Riggs	Cate Huisman	
Dick Kramer	David Eberlein-Stephenson	Austin Russell	Jamie Jarolimek	
Tom Kuglin	Tory Fantozzi	Cheryl Schroder	Andy Kennaly	
Rich Landers	Wendy Framois	Amber Spinney	Jody Kramer	
John Latta	David Gilbert	Laurie Stockwell	Eric Krausz	

Table 1-6. Private individuals and groups that allowed access to privately held property to conduct wildlife surveys. *Italicized names* indicate individuals or groups who contributed to the project in addition to allowing access. Apologies for inadvertent omissions.

Private Landowners	**Private Landowners (cont)**	**Private Landowners (cont)**
Roberta Burnham & Terry Hale	William & Melody Martz	James V. & Cynthia A. White
Chris Ashenbritter	John D. & Mary Ann Mason	Doyle & Betty Whitney
Edward C. Atkins	Jessica Matheson	Rand Wichman
Shirley A. Barksdale	Harvey C. May	Nolan Wiley
Dennis C. & Mary Ellen Bartel	Larry H. McIntosh	*Jim Hayden*
David Berklund	Elsie V. Monroe	Conrad Lahr
Pamela Bertram	Curtis Nelson	**Businesses and Industry Land Access**
Jerry & Virginia Botts	Orren E. & Virginia Overland	Carlin Bay LLC
Marion Brendis	Beth Paragamian	Buell Brothers, Inc.
James & Zelma Brisboy	Sonny Poirier	BF Builders, Inc.
Julie Bryant	Carla Poole	Golf Club at Black Rock LLC
Kenneth Chausse	Robert & Renita Radmer	Deep Creek Resort
Foster Cline	Max Reininger	*Coeur d'Alene Tribe*
Scott Crane	Richard & Gloria Rios	Krimm Enterprises, Inc.
Patrick D & Robin M Crnich	Donald & Marlene Roberts	Prairie Falls Golf Association
Steve & Peggy Cuvala	Robert & Karen Roman	T & T Farms, Inc.
Tom & Anna Davidson	Gordon Sanders	Gozzer Golf and Lake Club
Dean Peterson	Bonnie Scott	Red Horse Mountain Ranch
Hart Family Trust	Donald & Barbara Scott	Elk Mountain Farms, Inc.
Edith L. (Ros) Ferguson	Gregory Sempel	Schweitzer Mtn. Facilities LLC
Michael Fish	Brian H. & Michele Shay	River Pine Estate Property Owners
Walter & Denise Floch	Jerome Smith	Association
Kevin Fuhr	Erik Smith	Sylte Ranch LLC
Clinton & Carolyn Fullmer	Warren Smith	Skookum Rendezvous RV Resort
John & Karen Ganley	Roberta Smits	Pillar Rock and Boulder LLC
Gene B. Glazier	Sterling & Marilynn Snyder	CDS Stoneridge Assoc. Golf LLC
Daniel & Linda Green	*Robert Soumas*	Selle Valley Carden School
Daniel Hagman	Jeannine A. Spear	Twin Lakes Village Homeowners
Richard C. & Lois I. Hamacher	Gordon Stanley	Hecla Limited
Eric Hautala	James F. & Margaret Stevens	Molpus Woodlands Group;
Bernard & June Heinemann	Lennart M. Thorell	Carmona Tristar LLC
John Hudspeth	Jack & Marly Tibbitts	Inland Empire Paper Company
Guy Hulquist	Roger Titus	*Potlatch Corporation*
Jeff Hutchins	Timothy P. & Pamela Trimble	*Hancock Forest Management*
John Harbuck	Kehler Trust	Stimson Lumber Company
Michael & Joan Kerttu	Nancy Turley	
Vaughn & Natalie Leatherman	David P. Wenk	

Funding and Match

In the early 2000's, the U.S. Congress created two new funding mechanisms for non-game wildlife: the Wildlife Conservation and Restoration Program (WCRP) and the State and Tribal Wildlife Grants Program (STWGP). In 2001, Congress directed each U.S. state and territory to develop a State Wildlife Action Plan (SWAP) which would provide a list of Species of Greatest Conservation Need (SGCN) and describe Recommended Conservation Actions (RCA) for each of those species. In 2002, the WCRP and STWGP were merged into a single funding source, State Wildlife Grants (SWG) (Cook, M.T. 2008). SWG funds are independent of all other funding sources and are derived in part from offshore oil lease receipts (U.S. Fish and Wildlife Service Wildlife and Sport Fish Restoration Program 2015). By 2005, each state and territory had submitted a SWAP to the U.S. Fish and Wildlife Service which would guide the distribution of SWG funds and outline RCAs which would prevent SGCN being listed under the Endangered Species Act (ESA). Collectively, these plans represent a national action plan to prevent species from being classified as threatened or endangered under the ESA (Cook, M.T., 2008).

The USFWS requires each state to revise SWAPs on a decadal basis and all states were required to have submitted SWAP revisions to the USFWS by September, 2015. All states and territories receive an annual allotment of SWG dollars; however, this usually is not sufficient to implement all RCAs in the SWAP. To help bridge this gap, a portion of the national allotment is set aside each year and distributed through an annual competition for the Competitive State Wildlife Grant (C-SWG) fund. In 2012, the Idaho Department of Fish and Game (IDFG) and Washington Department of Fish and Wildlife (WDFW) were awarded a $950,000 C-SWG to implement the Multi-species Baseline Initiative (MBI) (Table 1-7, Appendix I).

This award formed the core (73%) of our cash funding and allowed us to build on previous and concurrent grants. In total, we operated on 7 grants totaling $1,297,697 from Idaho fiscal year 2010-2015 (Table 1-7). Five of our grants were from federal sources and 2 were from zoo conservation funds. We matched these federal dollars with $1,289,927 of cash and in kind contributions from 14 organizations and 1 private individual (Table 1-8).

Table 1-7. MBI funding and match sources for state of Idaho fiscal years 2010-2015 (all figures in US$).

Grant Source	Title	Agreement #	FY10	FY11	FY12	FY13	FY14	FY15	Total Indirect[a]	Grant Total[a]	Match Total	Match Source	Grant + Match[a]
RMRS[b]	ID Panhandle Biodiversity Initiative	10-JV-11221633-100	60,925	50,000	72,570			30,000	38,338	213,495	112,372	IDFG[g]/FSPW[h]	325,867
RMRS	WA Forest Carnivores	08-CS-11221633-194	16,556	26,511	61	21,261			5,637	64,389	98,528	FSPW	162,917
IPNF[c]	ID Panhandle Forest Carnivores	10-CS-11010400-023		2,143	23,544				3,925	25,687	85,064	IDFG	110,751
FWS-SWG[d]	SGCN Gastropod Surveys	T-3-17		13,994	6,878				3,877	20,872	20,872	IDFG	41,744
Oregon Zoo	Wolverine Survey	NA		4,400					709	4,400	0	NA	4,400
FWS-Sec.6[e]	Panhandle Forest Carnivores	E-64-TW-1			18,854				2,871	18,854	63,110	FSPW/ICL[i]/ZB[j]	81,964
FWS-cSWG[f]	MBI	F12AP01101				348,000	348,000	254,000	140,189	950,000	909,981	MBI Partners[k]	1,859,981
Total			**77,481**	**97,048**	**121,907**	**369,261**	**348,000**	**284,000**	**195,547**	**1,297,697**	**1,289,927**		**2,587,624**

[a] Indirect is included in FY, grant, and grant+match totals.
[b] US Forest Service Rocky Mountain Research Station.
[c] Idaho Panhandle National Forest.
[d] US Fish and Wildlife Service State Wildlife Grant.
[e] US Fish and Wildlife Service Section 6.
[f] US Fish and Wildlife Service Sport Fish and Wildlife Restoration Fund competitive state wildlife grant.
[g] Idaho Department of Fish and Game (IDFG).
[h] Friends of Scotchman Peaks Wilderness (FSPW).
[i] Idaho Conservation League.
[j] ZooBoise Conservation Fund.
[k] British Columbia Ministry of Forests Lands and Natural Resource Operations, Coeur d'Alene Tribe of Indians, FSPW, Hancock Forest Management, Idaho Conservation League, Idaho Department of Lands, IDFG, Kalispel Tribe of Indians, Idaho Office of Species Conservation, Potlatch Corporation, Private Donation (S. Cushman), Selkirk Outdoor Leadership and Education, University of Idaho, Washington Department of Fish and Wildlife.

Table 1-8. Sources of MBI cash and in kind matching funds (all figures in US$).

	Federal Grant Matched						
Matching Organization	10-JV-11221633-100	08-CS-11221633-194	10-CS-11010400-023	T-3-17	E-64-TW-1	F12AP01101	Total
British Columbia MNRO[a]						328,240	328,240
Coeur d'Alene Tribe of Indians						40,365	40,365
Friends of Scotchman Peaks Wilderness	52,416	98,528			16,705	136,172	303,821
Hancock Forest Management						1,156	1,156
Idaho Conservation League					16,705	8,051	24,756
Idaho Department of Lands						12,882	12,882
Idaho Department of Fish and Game	59,956		85,064	20,872		218,980	384,872
Kalispel Tribe of Indians						91,647	91,647
Idaho Office of Species Conservation						5,095	5,095
Potlatch Corporation						3,000	3,000
Private (S. Cushman)						17,396	17,396
Selkirk Outdoor Leadership and Education						23,525	23,525
University of Idaho						19,875	19,875
Washington Department of Fish & Wildlife						3,597	3,597
Zoo Boise Conservation Fund[b]					29,700		29,700
Total	**112,372**	**98,528**	**85,064**	**20,872**	**63,110**	**909,981**	**1,289,927**

[a] Ministry of Forests Lands and Natural Resource Operations

[b] Awarded directly to Friends of Scotchman Peaks Wilderness who used the grant for operating and personnel expenses related to MBI participation

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CHAPTER 1. Overview - Multi-species Baseline Initiative

Introduction

The world is changing fast, especially for wildlife. In order to implement meaningful actions that will effectively inform conservation efforts of the future, we need baseline knowledge of species' status and distribution at the landscape level. Such snapshots would allow us to pinpoint and act upon current conservation problems and allow future workers to adaptively manage species distribution and abundance over time. Our success in this endeavor rests on our ability to merge established techniques, partnerships, and funding mechanisms into creative new programs that allow us to move wildlife conservation forward at a pace that remains abreast of global change.

The most basic biological information is lacking for most species in most ecosystems. This information is often simple to collect and could often be gained in single field efforts. But due to lack of funding and interest, Recommended Conservation Actions (RCA) such as 'basic species inventory' for species listed in SWAPs often fall by the wayside.

Terrestrial gastropods are a case in point. Of the 229 SGCN listed in the 2005 Idaho SWAP (ISWAP), 49 were terrestrial gastropods. This was the second largest taxa group in the 2005 ISWAP, second only to the 54 bird SGCNs. While the RCAs listed for birds tended to be very specific recommendations on how to improve the status of the species (such as habitat manipulation), almost all of the terrestrial gastropods in the SWAP were identified as lacking basic occurrence data. Basic inventory was listed as a RCA for only one bird species in the 2005 ISWAP. In contrast, basic inventory was the primary RCA for 82% of terrestrial gastropods. Inventory was critical as we lacked sufficient knowledge of these species to know if they were truly rare, truly habitat specialists, or if there was just a lack of survey effort (IDFG 2005).

Given the general lack of human connection to invertebrates, it comes as little surprise that there is not a sufficient knowledge base for invertebrates. Even species with general public appeal, such as amphibians and mammalian carnivores, suffer from a lack of basic information. For example, wood frogs (*Rana sylvatica*) were listed in the 2005 ISWAP based on decades-old observations for which the taxonomy of available museum specimens was never verified. In another case, without a single field survey, the USFWS presumed all modeled wolverine (*Gulo gulo*) habitat within the MBI study area was occupied by that species (USFWS 2013).

Computer modeling and management plans are essential pieces of the conservation puzzle. However, both are of limited value without an inflow of sufficiently accurate data to validate models and add the "*adaptive"* portion to management plans. Our national strategy for wildlife conservation focuses on identifying and funding programs for species at risk. The process basically boils down to this: 2) make a list of species we are concerned about 3) develop management plans to conserve said species, 4) implement those actions on the ground, and 5) monitor those species to make sure the first steps worked.

Makes sense, right? Except there is a step missing. The first step should be 1) Develop a monitoring program that assesses the range, distribution, and abundance of species in multiple taxonomic groups. This would allow us to assess which species are truly at risk so that conservation dollars and efforts are most appropriately allocated.

One of the most basic aspects of human endeavor, to assess where we are before we move forward, is missing from our process. A field biologist or manager may see the need to collect distribution data on many species, but directives from the highest levels of government or available funding may concentrate on only a few species.

This is where we found ourselves in 2010. Our first partner, the Idaho Panhandle National Forest approached us with a need and funding to conduct wolverine (*Gulo gulo*) surveys. This fit well within the 2005 ISWAP RCAs and we accepted the project. However, instead of choosing a technique such as snow-tracking (Ulizio et al. 2006), which would only detect wolverines, we chose to further develop an existing technique that had potential to detect many species in multiple taxa groups. Bait stations (Robinson et al. *in prep*) not only allowed us to implement 2005 ISWAP RCAs for two additional SGCN but allowed us to collect a standardized data set for 28 species representing 12 families.

The absence of even basic information about the occurrence, distribution, and rarity of species makes it challenging to assess their vulnerability to current or future habitat conditions. Climate change is expected to drive large-scale shifts in ecological conditions as well as geographic dislocation of species' ranges (McCarthy 2001). It is essential to provide managers with solid information on how the dominant factor of human land use will interact with a changing climate and other factors to impact SGCN across their ranges.

In 2010 and 2011, Multi-species Baseline Initiative (MBI) partners implemented 2005 SWAP RCAs for 14 SGCN at 402 sites in a 10,171 km^2 study area spanning portions of Idaho, Washington, and Montana. During this time the project was called the Inland Maritime Initiative (Lucid et al. 2011). In 2012 the project name was changed to MBI when we were awarded a $950,000 Competitive State Wildlife Grant and we added 5 SGCN to our target list and expanded our study area to 22,975km^2.

Thanks to our collaborative approach, MBI has exceeded expectations. IDFG developed and expanded partnerships with adjoining state and provincial governments, federal agencies, Native American tribes, universities, private corporations, and non-governmental organizations. Our large community of partners pooled resources to implement the project. This included financial contributions and in-kind contributions of personnel time, operating expenses, and thousands of donated hours by hundreds of volunteer citizen naturalists. Our results demonstrate the feasibility of MBI and projects like it to maximize efficiency by surveying multiple taxonomic groups in single large-scale field efforts and to provide the most appropriate and current scientific knowledge for SWAP revisions.

MBI is a collaborative of organizations which, from 2010-2014, co-located micro-climate monitoring stations with multi-species wildlife surveys across the Idaho Panhandle and adjoining mountain ranges. Our goals were to: 1) assess the range, distribution, and S-Ranks of 19 SGCN listed in the 2005 ISWAP and WSWAP, 2) collect air and water temperature datasets at wildlife survey sites, 3) develop community, corporate, and agency partnerships to more efficiently implement RCAs, and 4) to develop and implement Phase I of a regional multi-taxa monitoring program.

Methods

Study Area

The project area consists primarily of IDFG's Panhandle Administrative Region (Panhandle) which stretches from the Clearwater Divide north to the Canadian Border. The study area encompasses portions of five mountain ranges; Saint Joe, Coeur d'Alenes, West Cabinets, Purcells, and Selkirks (Figure 1-2). The northern portion of the Panhandle narrows into a 70km wide strip of land which contains portions of the West Cabinet, Purcell, and Selkirk Mountains. To maintain ecological relevancy and build partnerships we expanded the study area west and east to the next major drainage to include portions of Washington and Montana. We expanded the study area north into British Columbia in order to most effectively implement the forest carnivore portion of the project and further develop international relationships with Canadian partners.

The U.S. portion of the study area consists of 22,975km^2 and ranges in elevation from 525-2350 meters. Flat glacial valleys are used by humans primarily for urban and rural settlement and contain small portions of remnant or reconstructed forested wetland habitat. Mountain ranges, which are used by humans for logging, mining, and recreation, rise steeply from valley floors to abundant sub-alpine and limited alpine habitat where the dominant human use is recreation.

The study area is a relatively wet area in the Inland Pacific Northwest averaging 100.3 cm of precipitation per year (PRISM Climate Group, Accessed May 27, 2016). Summers are typically short and hot with a drier period from July-September. Winters are moderate in temperature with heavy precipitation which currently falls primarily in the form of snow. One drainage in the study area, Lightning Creek, is thought to be the wettest drainage in Idaho receiving 229 cm of precipitation annually (https://www.nationalforests.org/who-we-are/our-impact/idaho Accessed 18 April, 2016).

The merging of Maritime, Rocky Mountain, and Boreal Forest ecological divisions results in the study area being on the fringe of many native species' ranges. The influence of different ecosystems, low elevation, and heavy precipitation make the study area a favorable location for high levels of temperate biological diversity.

The study area hosts one of the more diverse assemblages of coniferous trees in North America including grand fir (*Abies grandis*), western red cedar (*Thuja plicata*), subalpine fir (*Abies lasiocarpa*), Douglas fir (*Pseudotsuga menziesii*), western and mountain hemlock (*Tsuga heterophylla*, *Tsuga mertensiana*), lodgepole pine (*Pinus contorta*), western larch (*Larix occidentalis*), Engelmann spruce (*Picea engelmannii*), ponderosa pine (*Pinus ponderosa*), whitebark pine (*Pinus albicaulis*), and Western white pine (*Pinus monticola*). It also hosts at least some individuals of every native meso to large native mammalian carnivore including marten (*Martes americana*), fisher (*Pekania pennanti*), wolverine, bobcat (*Lynx rufus*), Canada lynx (*Lynx canadensis*), mountain lion (*Puma concolor*), coyote (*Canis latrans*), grey wolf (*Canis lupus*), black bear (*Ursus americanus*), and grizzly bear (*Ursus arctos*). Few species are confirmed to have been completely extirpated from the study area since pre-European settlement.

This biologically rich landscape presents an opportunity to understand a region where biological diversity remains largely intact and to develop a monitoring program to evaluate and potentially assist the adaptation of wildlife species to global change.

Study Design

We employed a systematic stratified sampling design by overlaying the study area with a 5x5km grid. We used ArcGIS 10.1 (Environmental Systems Research Institute, Redlands, CA) to build the grid (Figure 1-2).

We developed protocols for primary surveys at three types of sites: 1) terrestrial (gastropods), 2) wetland (amphibians), and 3) winter bait stations (forest carnivores). Our goal was to conduct one terrestrial invertebrate survey in all cells (n = 920) and a wetland amphibian survey in all cells in Idaho and Washington (n = 849) regardless of land ownership. We also aimed to conduct winter forest carnivore surveys in each high elevation cell (mean cell elevation >1,000m, n = 457 cells). We conducted all three types of survey in 43% (n = 392) of the cells in our study area.

We co-located terrestrial micro-climate data loggers at 90% (n = 894) of all terrestrial invertebrate survey sites. These data loggers recorded air temperature (n = 746) or air temperature and relative humidity (n = 148) for 1 (n = 493), 2 (n = 27), 3 (n = 290), or 4 (n = 84) years. We co-located terrestrial air and relative humidity data loggers at 50 of 424 wetland pond sites and aquatic water temperature data loggers in 131 ponds for one year (Table 1-9).

Table 1-9. Summary of surveys conducted 2010-2014 by type.

Year[a]	Terrestrial Gastropod		Wetland Amphibian		Carnivore Bait Station	
	Cells	Sites	Cells	Sites	Cells	Sites
2010	172	172			15	16
2011	318	322			17	17
2012					74	86
2013	497	498	641	659	97	97
2014			161	167	280	281
Totals	879[b]	992	802	826	457[b]	497

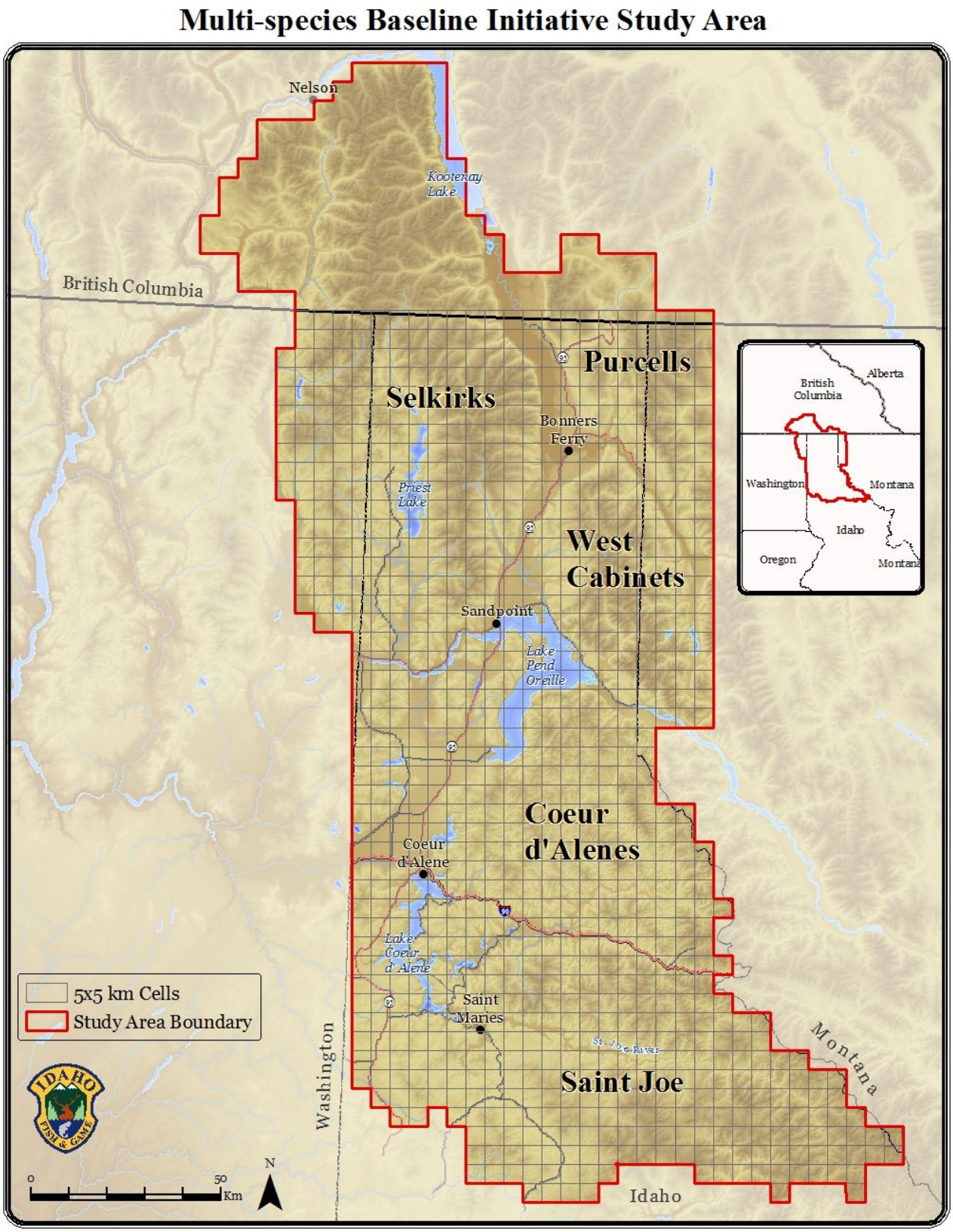
[a] Year refers to the first year of the winter season. A bait station associated with 2012 was run in the winter of 2012-13

[b] Some cells received multiple surveys across different years so column sum is greater than total number of cells surveyed.

We designed the three primary surveys to focus on our funded taxonomic groups: amphibians, terrestrial gastropods, and forest carnivores. For all surveys, we chose techniques which would enable reliable detection of all species within that taxa group, not just the funded SGCNs. At terrestrial gastropod survey sites, we deployed traps to collect ground and flying beetles. We also recorded occurrence data for a variety of other species which are easily detected and identified by field technicians at terrestrial plots (n = 16 species) and wetland plots (n = 14 species). In addition to forest carnivores, bait station cameras allowed for the detection of small mammals, ungulates, and birds.

Conclusions

In this report we summarize the current status of 19 target SGCN funded by the Competitive State Wildlife Grant we were awarded in 2012. We present the first comprehensive inventory of terrestrial gastropods and pond breeding amphibians with co-located micro-climate surveys in the study area. We also detail the most comprehensive forest carnivore survey in the study area to date. When combined with opportunistically collected species data, we provide standardized survey data for 182 species representing 8 taxonomic classes from 2,315 survey sites across our study area. This baseline inventory sets the stage for long term species occurrence and micro-climate monitoring which we recommend be implemented to assess changes in species abundance and distribution over time.



Map 1-1. MBI study area with overlay of 5x5 km grid. The 5 mountain ranges are labeled.

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