

# THE WILDLIFE PROFESSIONAL



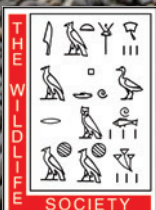
## A Wave of Die-offs

What's killing Pacific seabirds?

**RADical approaches to conservation**

**Coping with ecogrief in a 'world of wounds'**

**High expectations for TWS' 29th Annual Conference**



This article was originally published in *The Wildlife Professional*, an exclusive benefit for members of The Wildlife Society. Learn about more membership benefits and become a member at [wildlife.org/join](http://wildlife.org/join).

# A RADical Approach to Conservation in Alaska

RAPID CLIMATE CHANGE REQUIRES A NEW PERSPECTIVE

By Jeremy S. Littell, Gregor W. Schuurman, Joel H. Reynolds, John M. Morton and Nicole Schmitt

*This PDF has been provided to the author for personal and educational use. Additional distribution, republishing in part or whole, posting on a public website not managed by or affiliated with the author, or using for commercial purposes is protected under copyright laws and requires additional permission from the publisher and original author(s). ©2022 The Wildlife Society, 425 Barlow Place, Suite 200, Bethesda, MD 20814, USA.*



Credit: Joel Garlich-Miller/U.S. Fish and Wildlife Service

▲ To save walrus populations in Alaska, do we need to more aggressively resist or direct in response to loss of sea ice?

In Alaska, conservation areas are managed to promote the persistence of wild species, habitats, cultural resources, visitor experiences and ecosystem services. Many conservation areas are managed by federal or state agencies, and they have specific boundaries, missions and legislative mandates. Others are also the domains of Indigenous and local people who derive livelihoods and cultural identity from these lands and waters. These areas vary considerably as to whether they are managed solely for conservation versus other additional resources and ecological functions.

Myriad threats challenge the sustainability of these values, and conservation areas often exist to mitigate such threats. But regardless of jurisdiction, legal contexts or historical impacts, all these places face challenges—unprecedented during human habitation—from one globally pervasive threat: anthropogenic climate change.

Yes, ecosystems, including the people who depend on them, have adapted to constant change in Alaska

over most of the Holocene, if not before. This experience has conferred upon its constituents learned adaptive capacity, capabilities, and knowledges that are among the most flexible on the planet. But this time, the situation is different. The term “Anthropocene” has been used to describe an era in which humans influence planetary changes. Unlike the Holocene we have already experienced, the Anthropocene reflects a pace of change that has not been seen before.

Planetary temperatures warmed about 6 to 7 degrees Celsius from the last glacial maximum to the pre-industrial era (Osman et al. 2021). In the high latitudes, the amount of warming was roughly double the global average. But that was over a period of several millennia. Including warming that already occurred since the

early 20<sup>th</sup> century (IPCC 2021, Markon et al. 2017), Alaska and northwestern Canada are expected to experience climate changes nearly as large, but in only a *century and a half*.

Climate change will continually and profoundly impact the whole Arctic system and the peoples who depend on it even more so than the changes of the Holocene, including the recent centuries. Possibly sooner than later, the resulting ecological transformations will entail adapting to and managing novel systems that bear little resemblance to those with which we have experience.

As we navigate the consequences of the Anthropocene, scientists, practitioners and decision makers will increasingly be forced to try to apply knowledge gained from systems that no longer exist. Conservation, therefore, cannot rely solely on the lessons of the past. We can no longer apply such lessons literally. As we try to adapt to the effects of climate change, we need new approaches. One such approach, called RAD (for Resist, Accept, Direct),



could have useful applications in Alaska, which is home to most of the land mass of national wildlife refuges and national parks in the United States.

### Adapting our adaptations

Adaptation anticipates impacts and responds accordingly *before* opportunities are lost, costs of action increase or negative impacts become too severe. Sometimes, knowledge and experience indicate in advance what can be done differently to adapt. Other times, changes are surprising or novel or uncertain enough that adaptation must happen on the fly. Agencies that manage conservation areas have grappled with adaptation to climate change for two decades or more.

Most progress has focused on incorporating climate change information into already existing decision-making processes (through adding climate change vulnerability assessments and adaptation strategies) rather than developing new planning approaches. But increasingly, novel threats and fundamental changes to the very resources and ecological functions such places were established to protect are forcing more fundamental modifications in governance dimensions of agency-level planning and local conservation decision making.

Although many adaptation approaches devised in more developed landscapes might work in Alaska, others will not. Adaptation efforts in Alaska and northwestern Canada occur in a very different management context compared to their Lower 48 counterparts. Native peoples in rural villages comprise almost 22% of Alaska’s population. They rely culturally and economically on subsistence lifestyles in landscapes with relatively recent histories of colonization.

The 1971 Alaska Native Claims Settlement Act and 1980 Alaska National Interest Lands Conservation Act added unique layers of complexity in natural resource management through establishing subsistence as a right and creating the current landscape of 100 million acres of federal conservation units and 44 million acres of Alaska Native village and regional corporation lands. These large wild areas present

unique challenges and opportunities (e.g., [Magness et al. 2018](#)). While recent Arctic warming is four times the rate of the rest of the Earth (Jacobs et al. 2021), the impacts of many nonclimatic conservation stressors—such as industrial agriculture, pollution and urbanization—are much lower.

Over the last 15 years, the need to bridge the gap between what agencies do about climate change (interpret, plan, regulate) and what managers do in response to it (decide and, most importantly, act) has forced adaptation thinking to evolve toward a focus on *actions* that can address the challenges of climate impacts on conservation areas. The common themes that emerge result in frameworks that capture repeatable ways of engaging ideas and knowledge.

### What is RAD?

One framework rapidly gaining traction in the conservation world is RAD (Schuurman et al. 2020, 2022; [Thompson et al. 2021](#)). At its simplest, when facing a sustained, directional change, decision makers can choose among three largely exclusive responses. They can resist, pushing back on the trajectory by trying to keep things as they have been. They can accept, letting the change occur, usually because there is little possibility of successfully resisting, but sometimes because the outcome is acceptable or minimizing human intervention is

▼ We hesitate to *resist* the effects of declining sea ice by providing artificial haul-out platforms for walrus, but we enthusiastically extend the historical range of Anna’s hummingbird (*Calypte anna*) northward by providing year-round feeders along the Cook Inlet.



Credit: D. Chorman



prioritized. Or they can direct, actively intervening to steer the trajectory toward something more preferable or away from something unacceptable.

RAD streamlines the scope of future decisions. It requires considering—if not acting on—alternative futures and ways of managing. It forces clarity regarding intentions. It can encourage, but cannot guarantee, “outside the box” thinking. It also prompts clarifying questions regarding a potential action. Is the action trying to resist, accept or direct? Does it align with current or expected agency priorities, funding or policies? If not, why not? For

alter responses, transitions from one approach to another (e.g., from accept to resist, or from resist to direct) might be warranted (Magness et al. 2022).

RAD thinking might sound daunting at first, but there are practical advantages. Direct experience with a system and its species’ responses to disturbance or other effects is an advantage in using RAD, but it might not easily fit into other more abstract frameworks. Knowing how or when to intervene to achieve a desired outcome (or avoid an undesirable one) or even what plausible responses an action might trigger is critical to effective management.

### RAD in Alaska

It is tempting to think that the relative connectivity, wildness and intactness of Alaskan ecosystems render them more ecologically resilient or resistant. As per conservation biology theory, this intactness supports a growing number of documented range expansions (not invasions, e.g., Urban et al. 2020) by climate-tracking species in response to novel conditions. White spruce (*Picea glauca*) is moving down the Yukon River (Juday et al. 2015). Hummingbirds (*Calypte anna*) and owls (*Strix varia*) are migrating farther north along the southeastern Alaska coast (Grieg et al. 2017, Livezey 2009, respectively). Fishers (*Pekania pennanti*) are expanding into southeastern Alaska from adjacent Canada (Kupferman et al. 2021). Moose (*Alces alces*) and beaver (*Castor canadensis*) (Tape et al. 2016, 2018) are spreading into the Arctic.

But it is unclear whether most plant and arthropod species can successfully expand over the mountain ranges that structure current biogeography. For species that depend on sea ice, terrestrial connectivity cannot compensate for their loss of habitat. Meanwhile, more than 560 exotic flora and fauna have been introduced to Alaska (Simpson et al. 2019), many more than range expansions among native species would suggest. So while existing conservation area networks in Alaska are necessary, they may not be sufficient to accommodate 21st-century species range expansions, adaptation and refugia. They do, however, provide a good foundation for alternative strategies to succeed. Examples of RAD point to some of these strategies.

**Resist:** A classic resist strategy is our conventional invasive species management—removing species colonizing under climate change in an effort to



Credit: U.S. Fish and Wildlife Service

▲ We accept treeline rise in the alpine tundra and cottonwood colonization of Arctic tundra, but we hesitate when the first white spruce not deliberately planted on the North Slope is serendipitously translocated by a motor vehicle traveling up the Dalton Highway.

example, adaptive management is a common planning approach used when knowledge is imperfect, outcomes are uncertain and course corrections may be required to achieve objectives. Adaptation actions might eventually have unanticipated outcomes that require revisiting strategies. In such cases, RAD can be a useful addition to adaptive management and decision making (Lynch et al. 2022).

With its emphasis on system trajectories and action, RAD is also compatible with multiple knowledge frameworks, including Indigenous knowledge. As community experience or scientific results emerge that clarify how ecosystems might respond to climate change and how management actions can



preserve a previous ecological structure. Yet we have no clear framework for deciding, for example, when plant species native to Canada should be eradicated (as with *Elodea canadensis*) or planted (as with *Pinus contorta* subsp. *latifolia*) once they are introduced in Alaska. Common forms of resistance include curtailing the harvest of previously abundant species or herbiciding new but unwanted species (such as *Elodea*). More creative efforts might try to mimic disappearing habitat features, such as [haul-out platforms](#) for walrus (*Odobenus rosmarus*).

**Accept:** Accepting is not necessarily just giving in or giving up. Accepting Pacific salmon colonizing rivers or reaches where they were historically absent (e.g., chum salmon, *Oncorhynchus keta*, [Dunmall et al. 2022](#)) embraces what many see as a positive aspect of warming rivers in northern Alaska. Intentionally accepting situations that result from climate changes and variability can be strategic. It can also be a better use of management resources than repeating historical approaches in new contexts where they no longer work. For example, access routes that were maintainable under historical climates might no longer be tenable given permafrost thaw or extreme precipitation events. A strength of the RAD framework is its explicit recognition of the choice to accept the ecological trajectory—something that often occurs by default after nonstrategic action.

**Direct:** One example of directing is facilitating colonization (perhaps by assisting dispersal, [Karasov-Olson et al. 2021](#)), sometimes to avoid extirpation elsewhere. Hastening inevitable climate-driven migration could increase the probability of species persistence. Alternatively, introductions could be used to direct landscape change. For example, introducing bison (*Bison bison*) has been explored in response to the recent development of novel grasslands without a native grazer on the southern Kenai Peninsula ([Thompson et al. 2021](#), [Magness et al. 2022](#)), mainly to counter the system's trajectory toward lower landscape and community diversity. In protected areas in Alaska, such interventions can be contentious. Introducing species absent before European colonization could be interpreted as inconsistent with the concept of wilderness ([Kaye 2015](#)), a common value in protected areas. Similarly, deliberately accelerating permafrost thaw, such as in experiments near



Credit: B. Olson

Denali National Park ([Natali et al. 2014](#)), may contribute to achieving desired future conditions on acceptable time frames or terms and prepare the way for directing a response, but it would hasten change away from historical conditions.

These examples highlight the important role that values play in managing a rapidly changing system ([Clifford et al. 2022](#)). When is a nonnative species welcome and when is it not? When is continued resistance warranted and when is acceptance more cost effective? Who decides and on what terms? How do conservation areas' founding mandates and management requirements determine what a desirable outcome is? When we ask questions like these, our decisions may be more likely to succeed in the future (e.g., [Magness et al. 2022](#)). However, we may need to update agency planning processes and guidance (e.g., [National Park Service 2021](#)) to account for these considerations.

## Meeting the challenges

RAD demands that we evaluate our conservation goals based on historical conditions, current conditions and the future conditions we foresee or desire. To successfully apply the framework, we must acknowledge that in the foreseeable future, management under climate change—especially

▲ We hesitate to direct a fledgling *Calamagrostis canadensis*-dominated grassland on the southern Kenai Peninsula by introducing bison (*Bison bison*), which were here during the Pleistocene and occur elsewhere in Alaska today, but we welcome feral Chinese ring-necked pheasants (*Phasianus colchicus*) that now breed here.



in the high latitudes—will increasingly demand actions that respond to novel situations or take advantage of fleeting opportunities. At these junctures, decision makers may change course and experiment—and sometimes fail. Only by acting and learning from what happens will we discover how to operate effectively in this brave new world. This may require new flexibility at regional or local levels, as well as rethinking how and under what circumstances management choices can deviate from plans or norms founded on 20<sup>th</sup> century thinking and relative climatic stability.

**We must acknowledge that in the foreseeable future, management under climate change will increasingly demand actions that respond to novel situations or take advantage of fleeting opportunities.**

RAD's emphasis on managing for desirable conditions raises another issue. In Alaska's patchwork of legal jurisdictions, desirable conditions can vary considerably along with underlying values across neighboring tribal, state, federal and private lands. Decisions to resist, accept or direct might have unintended or unanticipated consequences for neighboring managers. If historically independent decision making is used, contested spaces and decisions may result, presenting novel legal issues and conflicts. Anticipating these value conflicts (and looking for adaptive common ground) before they arise—even collaborating on or co-producing decision contingencies—could be beneficial.

In practice, effective collaboration could focus less on agencies managing resources with input from stakeholders and more on communities and agencies partnering to determine desired futures, how adaptation strategies are constructed and what management actions support them. This approach reflects the reality that the fundamental driver—climate change—impacts all these lands, regardless of legal jurisdiction.

Finally, RAD decisions can be grounded in many knowledges, including Indigenous knowledges, local knowledge and science. Knowing how the near future will differ from the long experience in the Arctic is valuable, but so is understanding what people can do to promote desirable outcomes for themselves, species and landscapes. This is transformational

knowledge, not focused just on how the coupled human-natural world works (systems knowledge) or how people might better use information to achieve goals (target knowledge, e.g., [Pohl and Hirsch Hadorn 2008](#)), but instead on navigating unprecedented change.

People, cultures and decision contexts are all part of the Arctic emerging in the Anthropocene—and have been for most of the Holocene. Successfully using RAD as an adaptation tool will require expanding the scope of—and better integrating—scientific inquiry across disciplines. Alaska has the capacity to develop use-inspired translational science (e.g., [Enquist et al. 2017](#)) and knowledge necessary to navigate this transition. Boundary organizations such as the Alaska Climate Adaptation Science Center, the Alaska Center for Climate Assessment and Policy and the Scenarios Network for Alaska and Arctic Planning work to collectively develop information needed and collaborate with diverse NGOs (such as the Alaska Conservation Foundation and Alaska Wildlife Alliance) to apply this information toward conservation adaptation.

Accommodating the unprecedentedly rapid changes and challenges will require adaptation in agency conservation decisions, the legal frameworks in which they are made and the ways knowledges inform them. RAD does not solve climate change problems, but it does provide a tool for focusing adaptation decisions. Paired with management and adaptive learning that draw on the lessons of the past while reckoning with an unfamiliar future, RAD provides a tool for conservation area managers to meet the challenges of climate change head on. ■



**Jeremy Littell, PhD**, is a climate impacts research ecologist at the U.S. Geological Survey Alaska Climate Adaptation Science Center.

**Gregor W. Schuurman, PhD**, is an ecologist at the National Park Service's Climate Change Response Program.

**Joel Reynolds, PhD**, is Climate Science and Adaptation Coordinator at the National Park Service's Climate Change Response Program.

**John M. Morton, PhD**, is board vice president with the Alaska Wildlife Alliance.

**Nicole Schmitt** is executive director of the Alaska Wildlife Alliance.