

Arctic BioMap:

A community-specific database to track wildlife biodiversity, disease and environmental change



Overview

An analysis of observational data is key to understand the unprecedented and accelerating system-wide environmental change in the Arctic. A comprehensive, Arctic system-based (physical, biological, and human) and community-specific understanding is lacking in explaining the interactions and feedbacks among the different components of the arctic system and in responding to arctic changes. Such a task requires wide stakeholder engagement in knowledge generation and knowledge transfer processes. An innovative approach to accessibility and data management is needed to advance the science and to improve management of and adaptation to a changing Arctic.

Arctic BioMap is a data platform for citizen science/community-based Arctic change tracking program for assessment, research, management, and education. It will monitor:

- (1) Wildlife biodiversity and disease surveillance
- (2) Environmental observations
- (3) Community-specific database on public health, social, economic and political demographics
- (4) Community-specific maps of high-risk areas.

Monitoring the environment and human and wildlife health is important for understanding the risks, benefits, and for adaptation. Arctic BioMap will facilitate a forum for continuous exchange and communication among community members, resource managers, policy makers, and scholars providing useful and community relevant information on environmental and health observations. The application could be an invaluable tool for gathering community specific data, emergency response, and adaptation planning as well as for the communities to take ownership of any interventions undertaken.



How does it work?

Arctic BioMap is a simple, interactive, and intuitive web-platform that engages its users to submit observations or view results about unique or unusual environmental and wildlife biodiversity and health events. Arctic BioMap provides various options for data gathering and visualization. A user simply enters when, where they went for an outing and enters what they have seen based on a checklist of sightings, track counts, or other observations of sickness in animals, and environmental change. Each of the observations entered are listed by date, time and corresponding weather conditions of the day and has the ability to tag photos, audio/video recordings, links, and attachments. Users can maintain their personal records or view records collectively. The data can be visualized with interactive maps, graphs and charts. Arctic BioMap uses open-access Arctic WebMap based on exact polar projections to build their maps. A new map will be developed each month. Maps can also developed on topics of interest such as by species, diseases or based on specific environmental issue of concern to fully visualize the impacts of environmental change on wildlife. All maps are archived on the Arctic BioMap website and will be reviewed monthly with community partners.

Arctic BioMap is built in collaboration with the School of Veterinary Medicine, Geo Sensor Web Lab, Canadian Wildlife Health Cooperative and the Arctic Institute of North America at the University of Calgary and in consultation with many northern communities. One activity will be to apply the app for wildlife disease surveillance. With this facility, the hunters can take notes, pictures, or videos of sightings as well as abnormalities they see. This information with its corresponding geographic location, weather, and time will automatically be uploaded to a central repository when the contributor will be in cell phone range, which an 'expert' from the School of Veterinary Medicine can access and respond within 24 hours and follow up on any concerns. Arctic BioMap is compatible with the Canadian Wildlife Health Cooperative and the Circumpolar Biodiversity Monitoring Program. Any wildlife disease reports can be easily uploaded to these systems to improve wildlife disease outbreaks and monitoring in general.

Data Integration

Arctic BioMap collects observations from community members through mobile Apps and web portals. In this way Arctic BioMap targets specific audiences with local expertise, promotion, and project ownership. Portals may have a regional focus or they may have more specific goals and/or specific methodologies. Arctic BioMap is fully integrated within the Arctic Connect database and application infrastructure so that data can be analyzed across political and geographic boundaries and across topics of interest. For example, observers entering observations of caribou in Yukon can view those data separately, or with the entire caribou data set gathered by Arctic BioMap across the Northern hemisphere. Automated data quality filters developed by regional experts will review all submissions before they enter the database. Local experts will review unusual records that are flagged by the filters.



Data Accessibility

Arctic BioMap data are stored in a secure facility and archived daily, and are accessible to anyone via the Arctic BioMap web site. ArcticBioMap members and their community organizations are responsible for deciding what information to share with the network.

Any contribution made to Arctic BioMap increases our understanding of the distribution, richness, and uniqueness of the biodiversity of our planet.

Benefits

- Real-time Monitoring
- Interact with a network of community members, local experts, and researchers
- Feedback in 24 hours
- Get community-specific data and community relevant information on species biodiversity, wildlife disease risks and environmental change
- Detect new sightings/outbreaks/deaths/environmental observations
- Keep track of your personal observations as well as view cumulative results.
- Visual display on maps and graphs. Explore dynamic maps based on more accurate polar projections, graphs and charts
- Image gallery to cater to the needs of diverse, lay and expert audience
- Easier to generate a spreadsheets on observations. 7 specific databases on sightings, dead sightings, track counts, disease, harvest dates, environmental change and harvesting challenges
- Communities can take ownership
- Updated 24/7/365

Limitations

- A technological application to gather data might dissuade participation from people who are not introduced to such applications
- Not all communities in the Arctic have cell coverage but increasingly many of the communities have Wi-Fi access, and Arctic BioMap application can work on Wi-Fi connection
- Younger people who grew up with technology might be more prone to use the Arctic BioMap applications than older people with more experience.
- Severe weather conditions might prevent the use of Arctic BioMap on the field and such data gaps will need to be acknowledged
- Community incentives maybe essential to improve participation

Who are we?

Arctic BioMap is based at the Arctic Institute of North America at the University of Calgary. Arctic BioMap was designed in partnership with the School of Veterinary

Medicine, Canadian Wildlife Health Cooperative, and Geo Sensor Web Lab in consultation with northern communities.

Related web links:

Arctic Connect: <http://www.arcticconnect.org>

Arctic Institute of North America: <http://arctic.ucalgary.ca/>

ASTIS Data Base: <http://arctic.ucalgary.ca/databases>

Kutz Research Group, Veterinary Medicine: <http://people.ucalgary.ca/~kutzrg/index.html>

GeoSensor WebLab: <http://sensorweb.geomatics.ucalgary.ca>

Canadian Wildlife Health Cooperative: <http://www.healthywildlife.ca/category/alberta/>

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