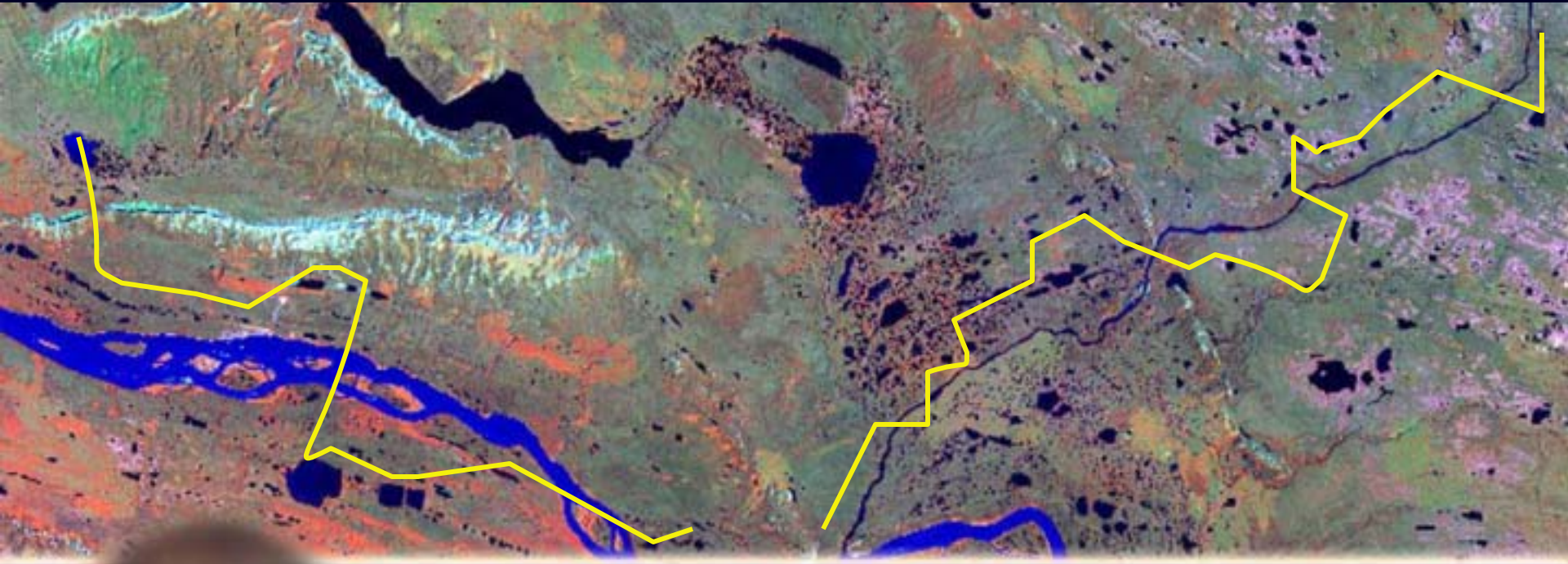


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Advancing Conservation

Through the Development of Customized
Moving Map Software

DUC Navigator

Abstract

Ducks Unlimited Canada has been using GIS/GPS technology for more than a decade to help deliver wetland conservation programs throughout Canada. Program work including waterbird surveys, water quality sampling and remote sensing ground-truthing throughout remote forested regions of Western Canada is largely aerial based, requiring mobile GPS/GIS tools to aid staff in acquiring science based information. Application development for specific program needs has led to the development of a customized moving map software tool for ArcMap called "DUC Navigator", which includes support for multiple GPS data types, moving map navigation, the ability to upload and download GPS routes, tracks, and waypoints, and the central storage of the data in a personal geodatabase. This paper will provide an overview of the extension and its application to Ducks Unlimited's conservation work.



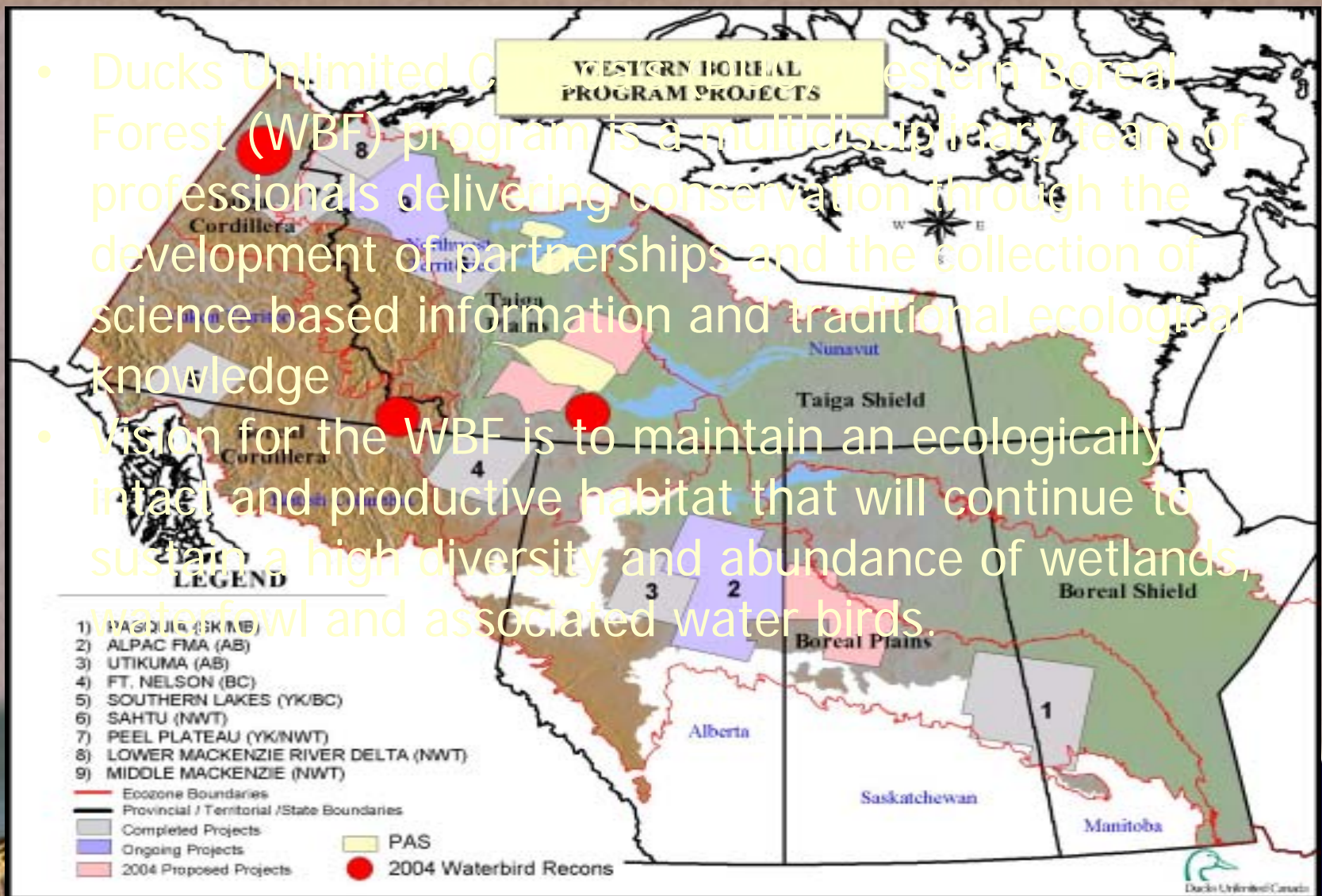
DUC Navigator

Outline

- **Introduction**
- **Program Background**
- **Software Development**
- **Application In Field**
- **Program Direction**
- **Acknowledgements**



- Ducks Unlimited Canada's Western Boreal Forest (WBF) program is a multidisciplinary team of professionals delivering conservation through the development of partnerships and the collection of science based information and traditional ecological knowledge
- Vision for the WBF is to maintain an ecologically intact and productive habitat that will continue to sustain a high diversity and abundance of wetlands, waterfowl and associated water birds.



• Introduction

- GIS is a core component to DUC's conservation programs
- We use a full suite of ESRI tools for data collection, analysis, management, and visualization



DUC Navigator

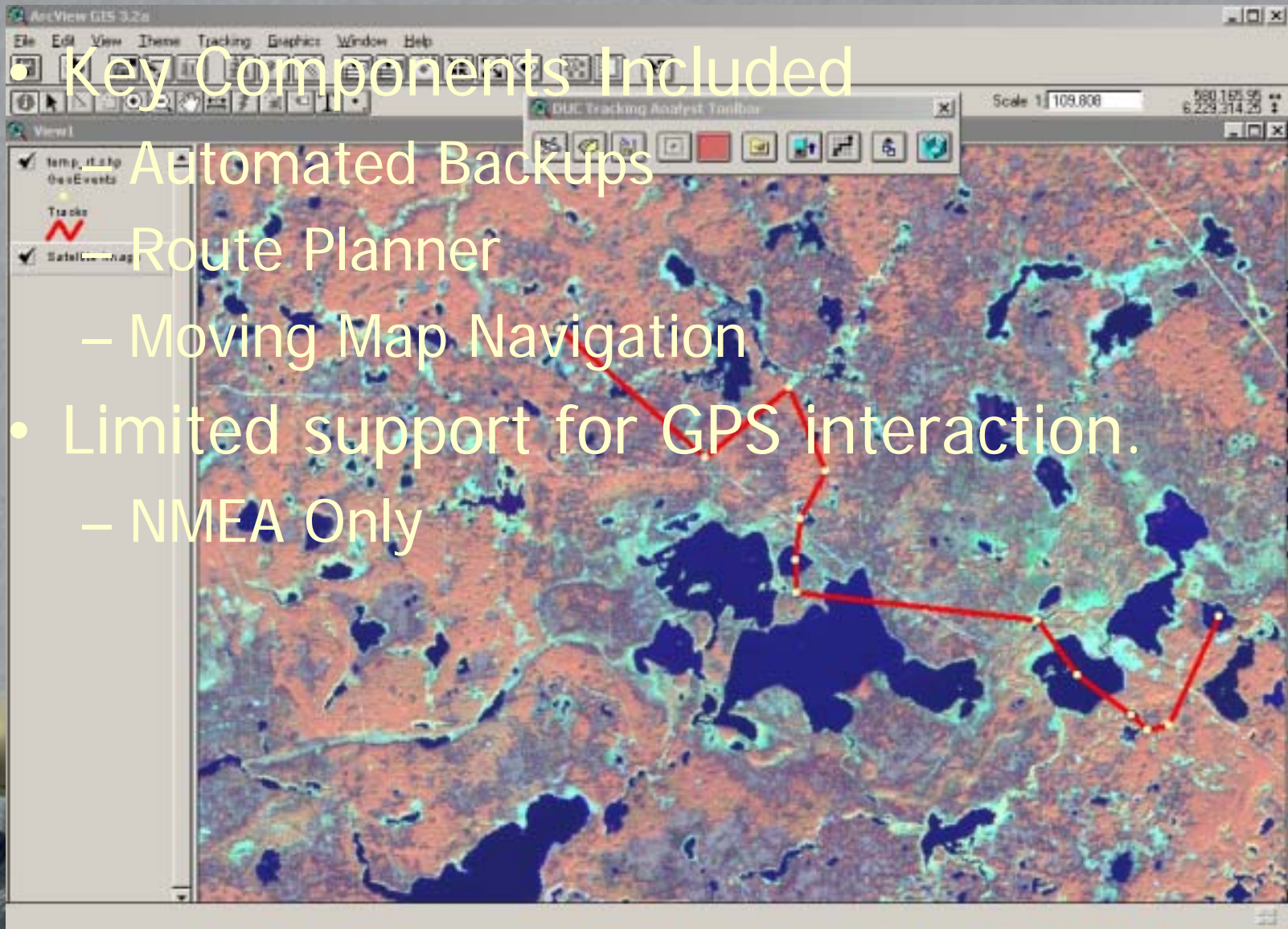
▪ **Program Background**

- Need for improved data collection
- Need for standard Data formats and Structures
- Wanted to use our strong partnership with ESRI



DUC Navigator

▪ **Program Background**
Need for Moving Map Tool



- Key Components Included

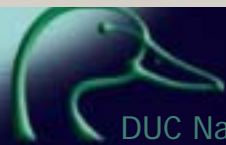
- Automated Backups

- Route Planner

- Moving Map Navigation

- Limited support for GPS interaction.

- NMEA Only



DUC Navigator

▪ Program Background

Moving Map Tool

- Some sources of instability while navigating
- Data logged in memory not to disk which was troublesome
- Flexibility of Component Object Model (COM) based application not available.



DUC Navigator

▪ Program Background Rationale for Redevelopment in ArcGIS

- Decision Made to migrate software into the ArcGIS Platform
- DUC Navigator developed in .NET 2003 and ArcObjects 8.3
- Kapie Systems Limited GPS API used for interaction with the GPS



▪ **Software Development**

- Moving Map Navigation
 - Data collected at 1 second intervals
- Route manager allowing users to define routes in ArcMap
- Hotkeys used to log waypoints and describe attribute information



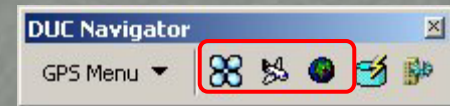
DUC Navigator

▪ **Software Development**
Software Features

- Flight Distance calculator
- Manages gps uploads and downloads
 - Routes, tracks, waypoints
- Support for Proprietary data formats
 - Garmin GPS -
 - » Garmin/Garmin
 - » NMEA 0183 – GGA/GLL
 - Magellan GPS
 - » NMEA 0183 – GGA/GLL

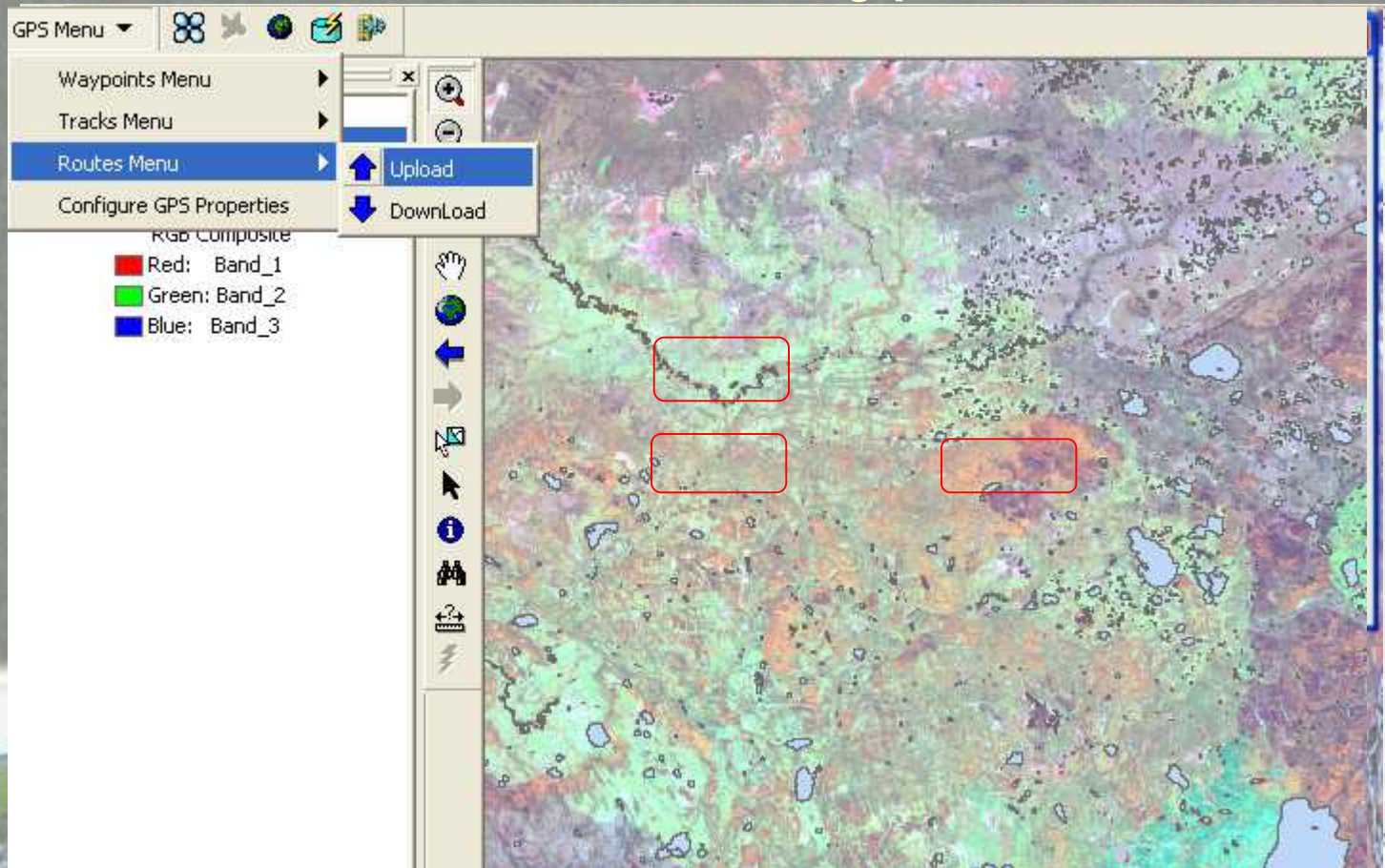


- Software used for Aerial Waterfowl surveys
- Biologists link Track Log information to waterbird and other wildlife observations via database application
- Tools to aid pilot navigation

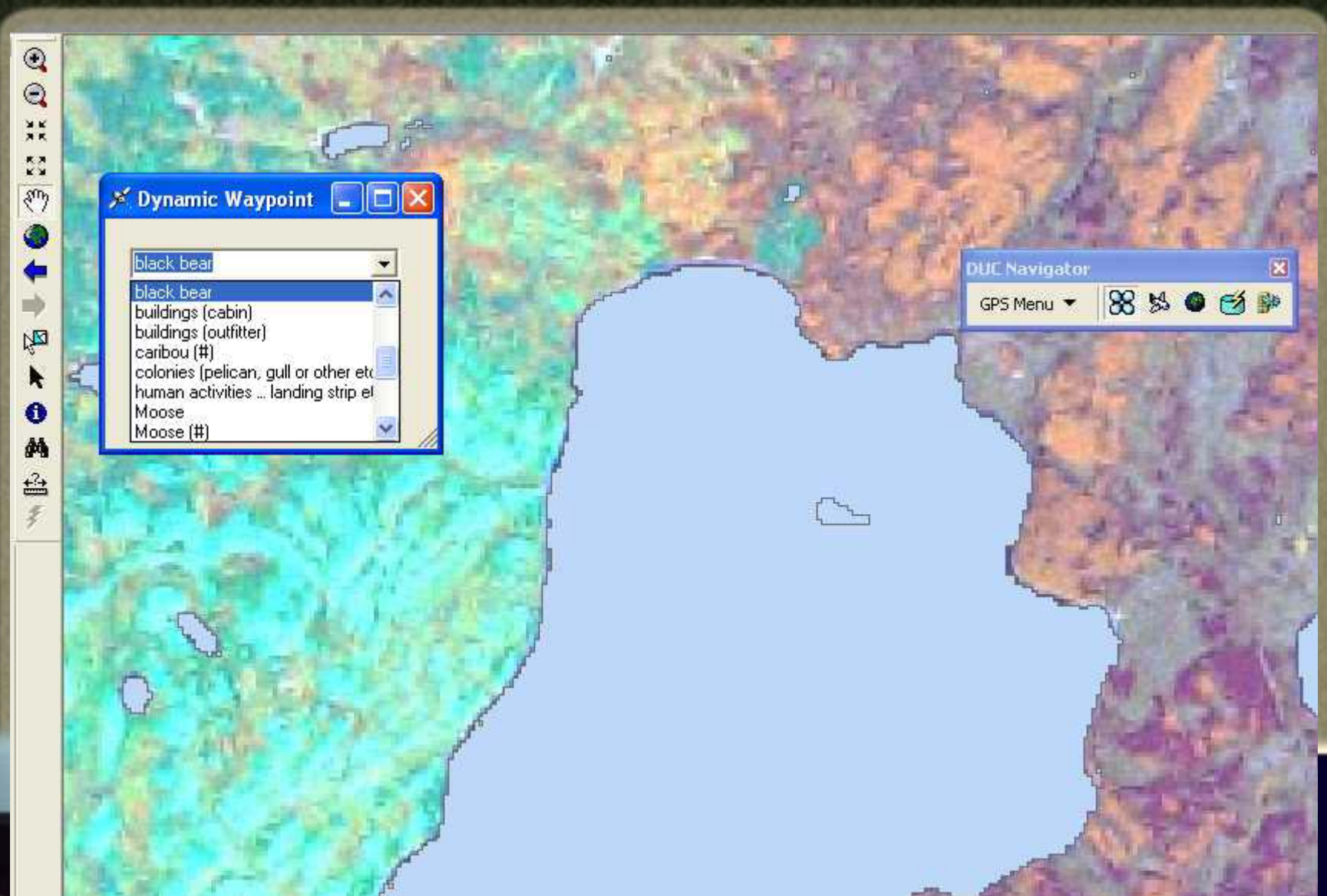


▪ **Application In Field**
Moving Map Capability

- Biologists also use the tools to manage predefined routes and waypoints.



▪ **Application In Field**
Route Management



Application In Field

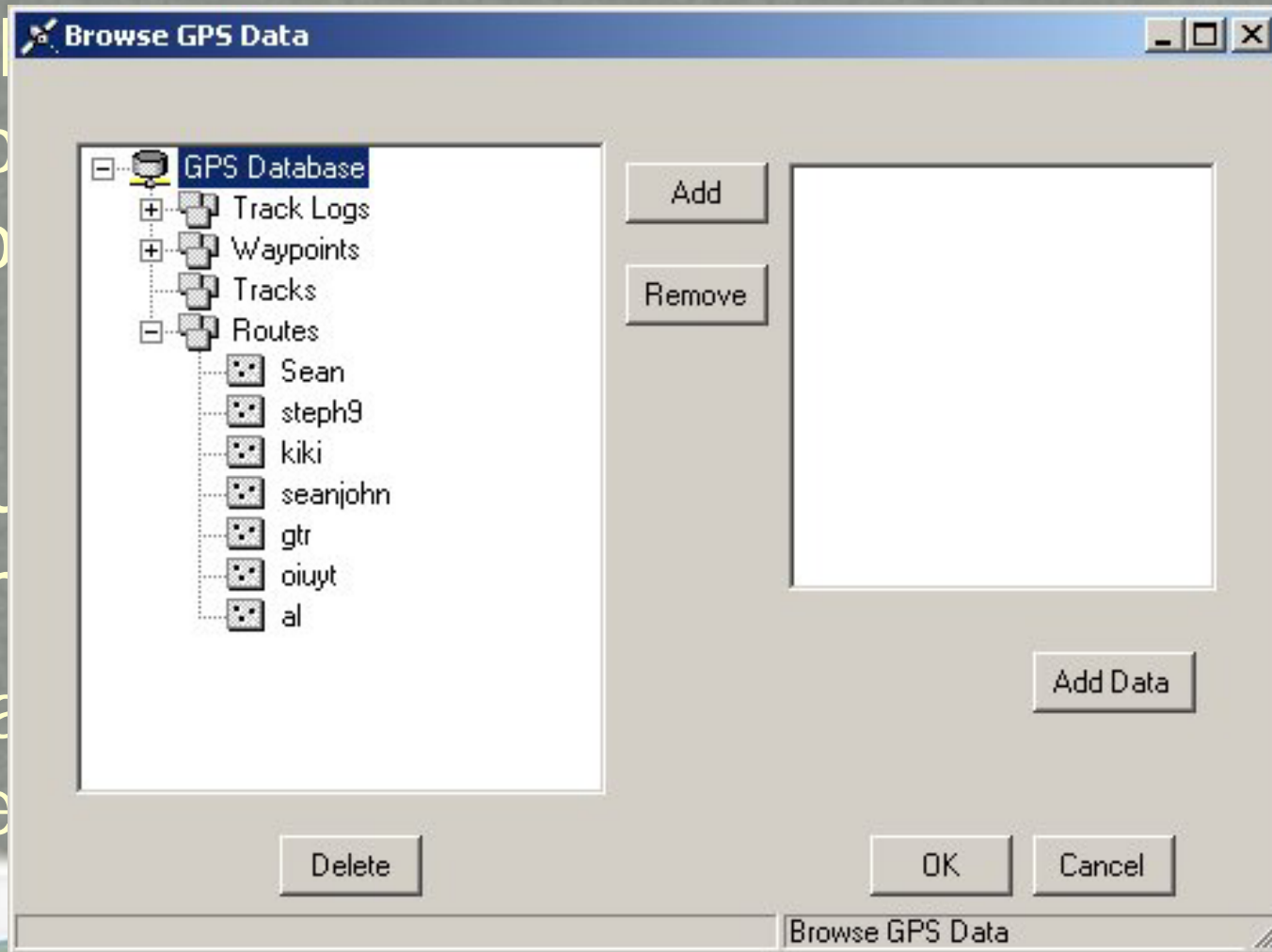
Hotkeys / Accelerators

- At the request of our users we have developed a Flight Distance Calculator
- Users define an input polygon file representative of a water layer used for our survey selection
- Application calculates the amount of time and distance spent per survey over water



▪ **Application In Field**
Flight Distance Calculator

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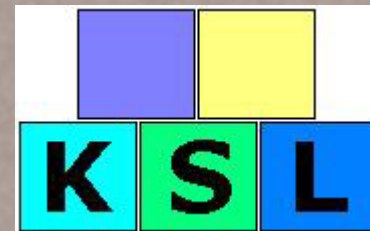
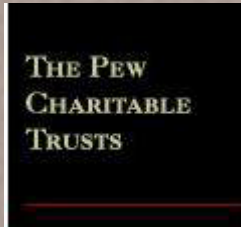
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▪ Application In Field GPS interface and Data Storage

- Incorporate a utility to geo-locate digital photos taken along our flights paths
- Enhance current functionality.
- Develop capability to transfer field data into an enterprise SDE system



▪ **Program Direction**



▪ Acknowledgements

“Helping Conserve North American Wetlands for Waterfowl , Wildlife and People”

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DUC Navigator

Thank You