Error Checking System of Spatial Attributes in Pesticide Use Report (PUR) Database

Minghua Zhang[1], Yinyan Guo[1], Larry Wilhoit[2] and John Steggall[3]

[1]Agricultural Geographic Information System Laboratory (AGIS), Department of Land, Air and Water Resources, UC Davis, CA 95616
[2]Department of Pesticide Regulation, 830 K Street, Sacramento, CA 95814
[3]Department of Food and Agriculture, 1220 N Street, Sacramento, CA 95814

Introduction

The Pesticide Use Report (PUR) database has become a valuable data resource for researchers, regulators, farmers and policy makers who are interested in pesticide management and environmental impact assessments. However, data quality is a concern for some detailed/specific studies at a small-scale level.

This study focused on :
- To develop computer-aided methods to identify errors of spatial attributes
- To examine and improve the accuracy of geocoding for Public Land Survey System (PLSS) and site location identifications in PUR
- To examine the accuracy of the combinations of site location identification related fields
- To identify the accuracy of the commodity received pesticide applications in PUR by comparing the spatial locations of each commodity in the PUR with the maps of land use from the California Department of Water Resources (DWR).

FLOW CHART OF PUR ERROR CHECKING SYSTEM
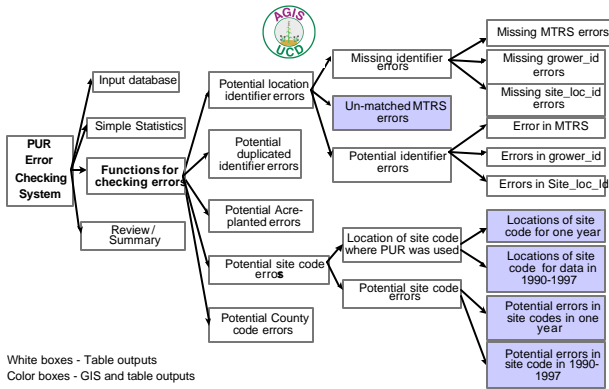
White boxes - Table outputs
Color boxes - GIS and table outputs

Materials and Methods

Spatial Attributes:
- County code
- Township/range/section
- Grower identification
- Site location identification
- Site Code (commodity name)
- Duplicated records
- Multiple Acre planted values for the same field

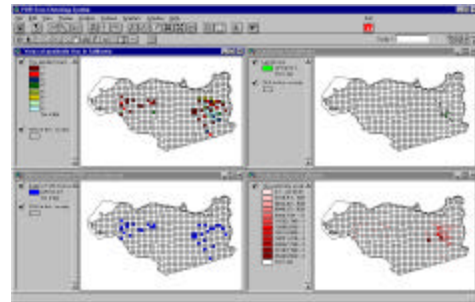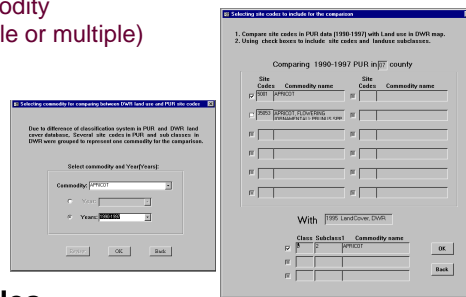### Software, Hardware and Materials:
Access database
ArcView and Avenue programming
Visual Basic
Excel Spreadsheet

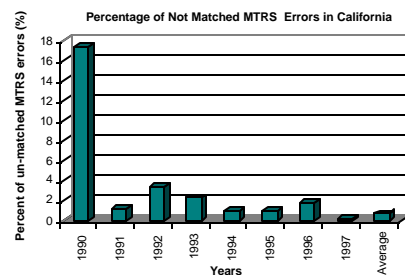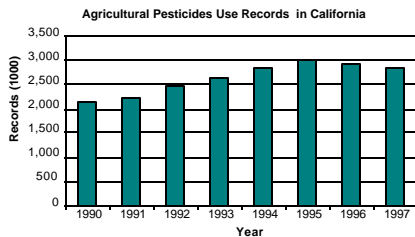Hardware - NT PC computer
PUR data by county in dBase format

Site code Error Checking by Comparing with DWR land use map

1. Select the commodity
2. Select year (single or multiple) of PUR data
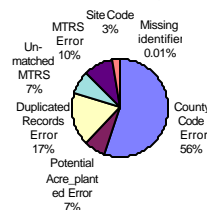3. Map the landuse and the locations of pesticide use in ArcView

Result Examples

Major Error Types Considered in the program

Error types and their percentage (Yolo 1990 Data)

Conclusions

- The program allows you to check for 14 error types and the potential errors of each type are saved for review.
- The error rates of spatial attributes vary from 0.1 to 5% of the total records from agricultural production depending on the error categories.
- The error rate decreased dramatically from 1990 to 1991 and fluctuated around 1-3% for unmatched MTRS.
- Although the error rates are relatively low in some cases, these errors may jeapordize certain types of analyses, especially for small-scale risk assessment or pest management.
- In other cases, error rates are quite remarkable, suggesting that a great deal of work is needed to improve PUR data quality.

Acknowledgement