Biosolids Land Application and Phosphorus Management

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Biosolids is rich in nitrogen and phosphorus

- Biosolids land application rates are presently determined on nitrogen rate.
- When applying at N application rate P is usually supplied in large quantities.
- Need to take into account off site movement of P.
- Can lead to environmental issues in sensitive bodies of water.
- P from biosolids is only about 40% available as compared to commercial P.

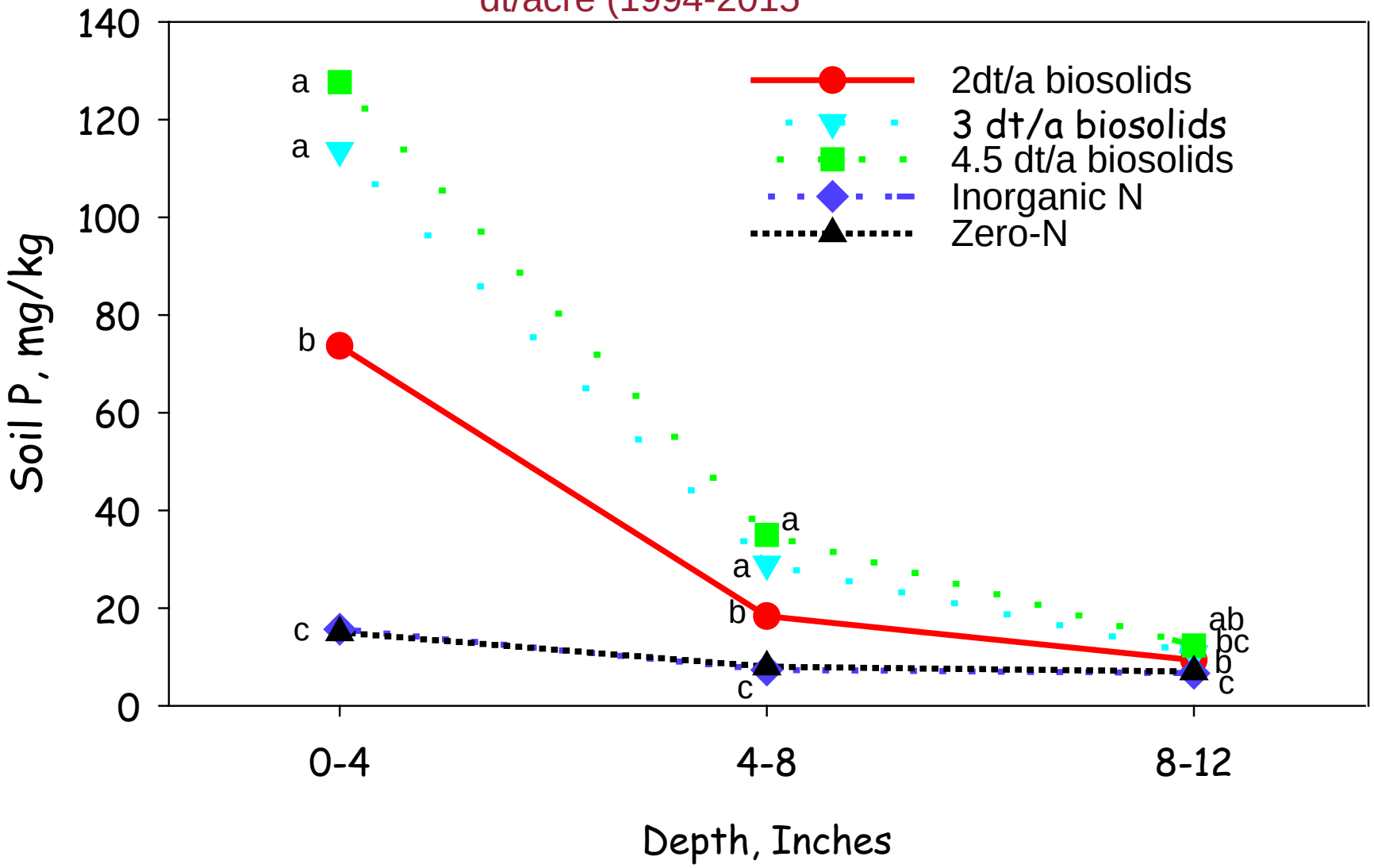
Biosolids is rich in nitrogen and phosphorus

- Some treatment plants add aluminum, iron or calcium compounds renders the P less soluble.

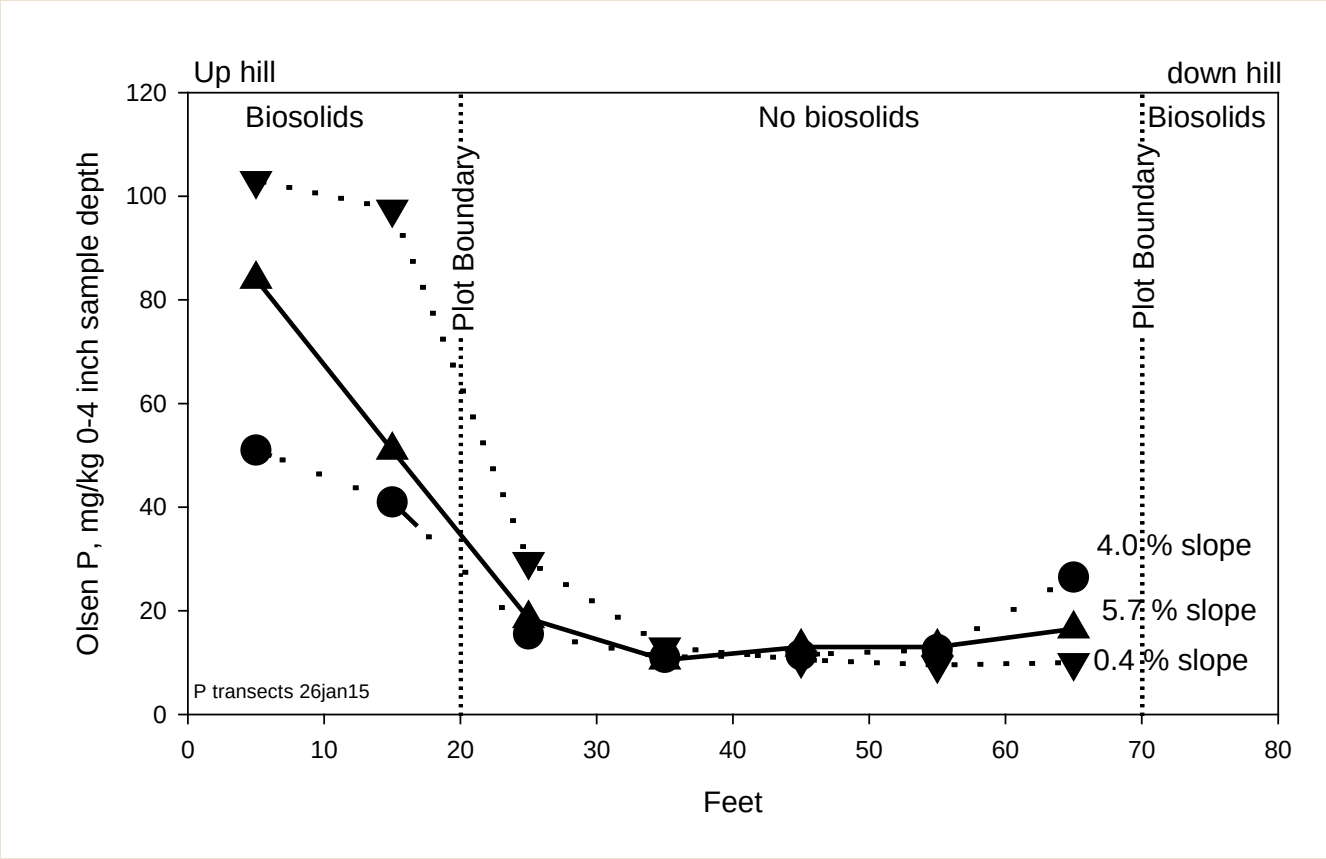
- As iron, aluminum and calcium levels increase, P solubility decreases

Repeated biosolids applications increase soil test P in surface soil.

Soil test P in dryland wheat after 5 biosolids applications of 2, 3, and 4.5 dt/acre (1994-2015



At the same site, little movement of P has occurred across the field, suggesting a low risk of P loss.



Evaluating P Risk to Environmental Degradation

- Traditional University fertilizer guides were developed to help farmers to decide when it is economically important to add P.
- P index was developed to help judge the environmental risk to off site movement of P.
- If using NRCS program you may need to take phosphorus loading into account.
- NRCS uses the phosphorus index to judge the risk of Phosphorus moving off site.

Conservation Stewardship Program , Code WQL-11

- Uses precision agriculture technologies to apply nutrients.
- These technologies protect surface and ground water
- Site specific yield and soil test information needed to develop yield and application maps
- Requires getting GPS technologies on combines and manure spreaders
- This program requires additional documentation for biosolids application

Conservation Stewardship Program , Code WQL-11

- Uses 5 defined management zone (DMZ) yield maps
- Uses 3 zone biosolids application maps to apply biosolids
- Can develop post application biosolids application maps
- Must have completed P index for each field, zone and source of biosolids

Phosphorus Index
Transport factors

- **Soil erosion**
- **Irrigated induce factors**
- **Runoff class**
- **Flooding hazard**
- **Distance to surface waters**
- **Subsurface drainage**

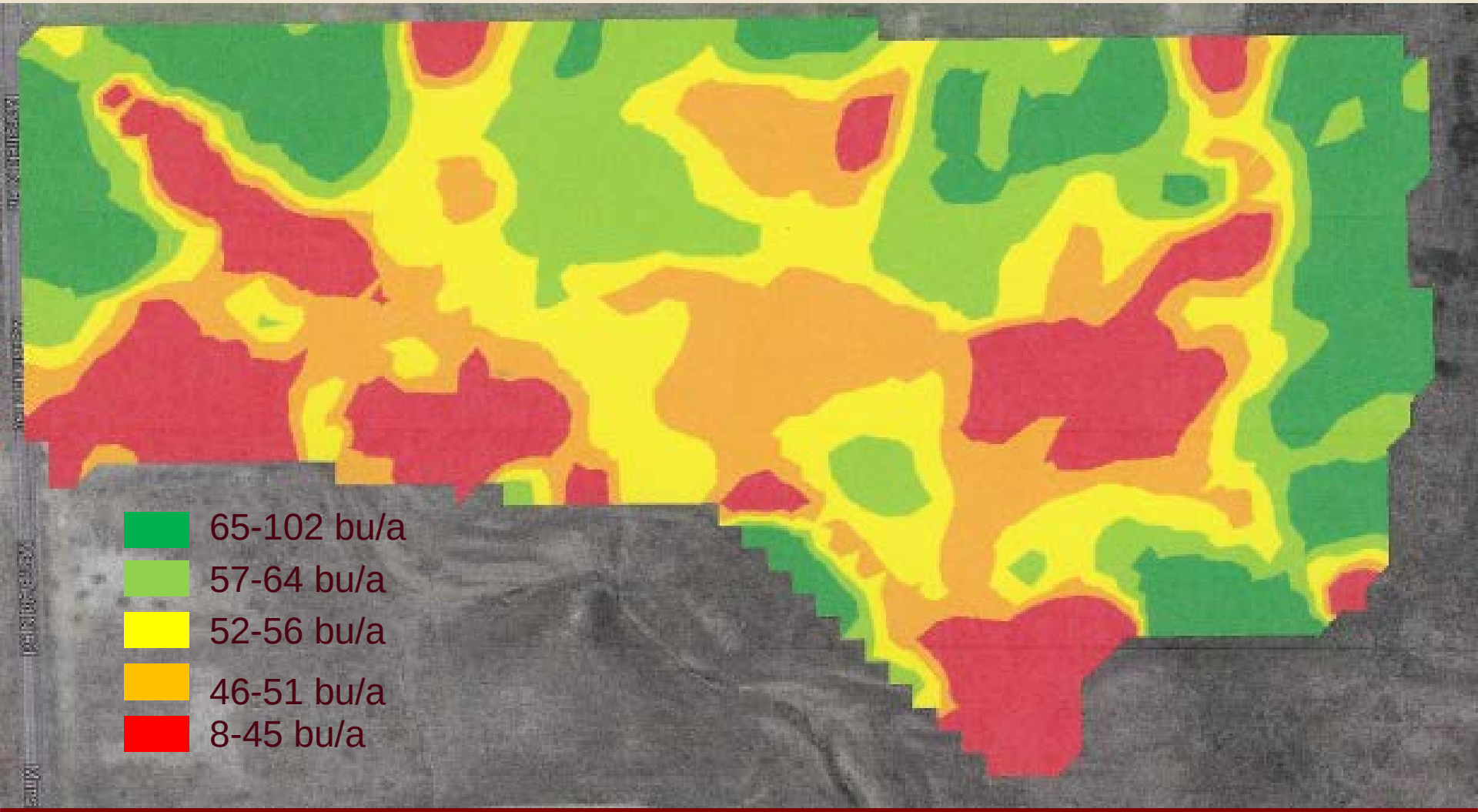
Phosphorus Index
Source factors

- **Soil test P concentration**
- **Commercial P application rate**
- **Commercial P app. method**
- **Organic P source application rate**
- **Organic P source app. method**

Phosphorus Index
Risk estimated from source and transport factors

- **Low: low potential for off site movement**
- **Moderate: greater potential than low for off site movement**
- **High: High risk of impact to surface water resources**

Douglas County, Boulder Park DM4A, Yield Map



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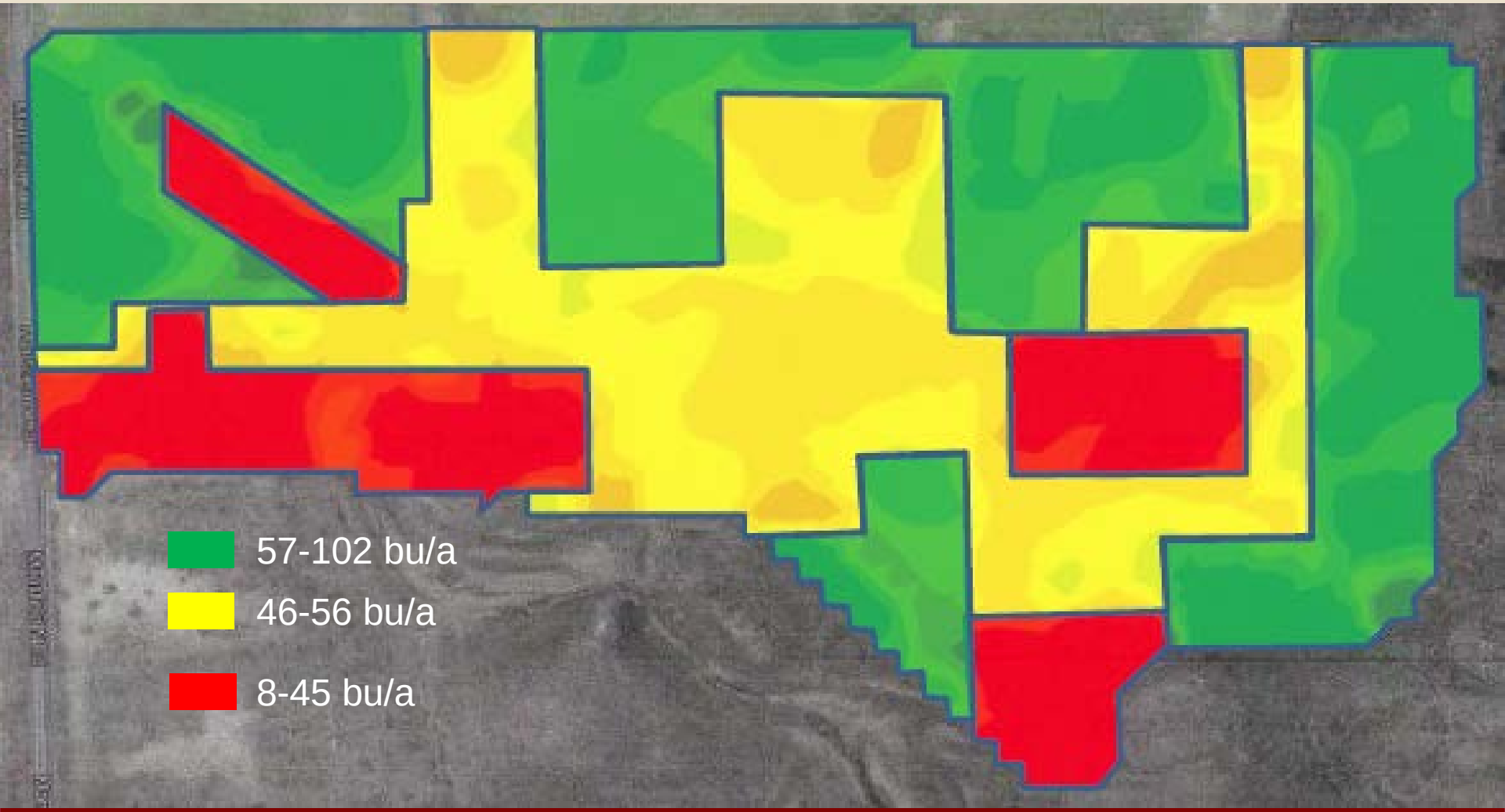
Douglas County, Boulder Park DM4A, Yield Map



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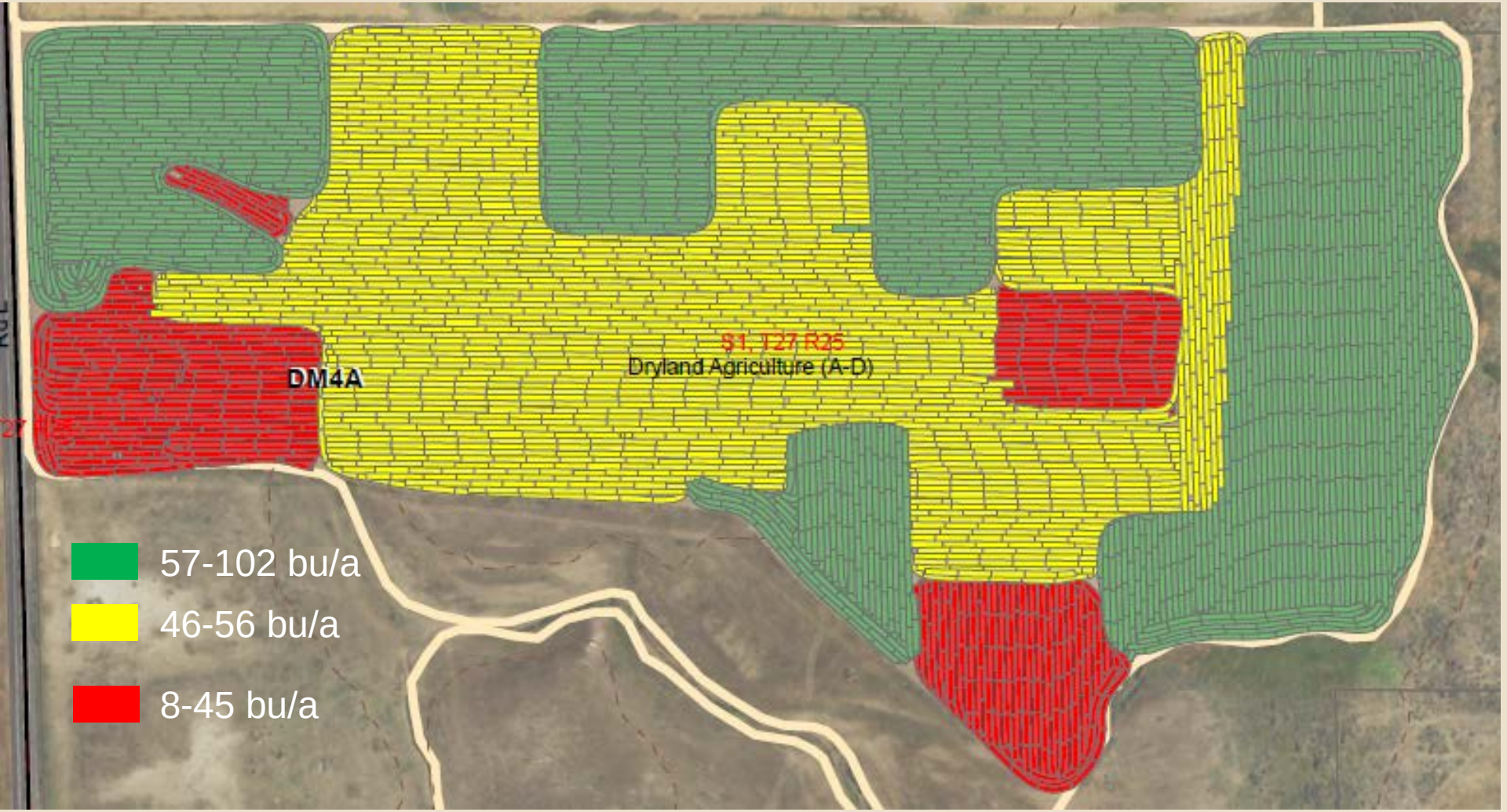
Douglas County, Boulder Park DM4A, Biosolids Application Map



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