

# Migratory Bird Depredation Permits



Depredation - agricultural damage, private property damage, threats to human health and safety and threats to recovery of protected wildlife.

Depredation permits – short-term relief for bird damage until long-term nonlethal measures can be implemented to eliminate or significantly reduce the problem.

Depredation permits can be obtained by an entity experiencing damage or who is responsible for compliance with the permit (USDA-WS), AND has authority to implement non-lethal measures.



# Migratory Bird Depredation Permits



Take – killing birds, trapping birds, egg addling (oiling), destruction of active nests.

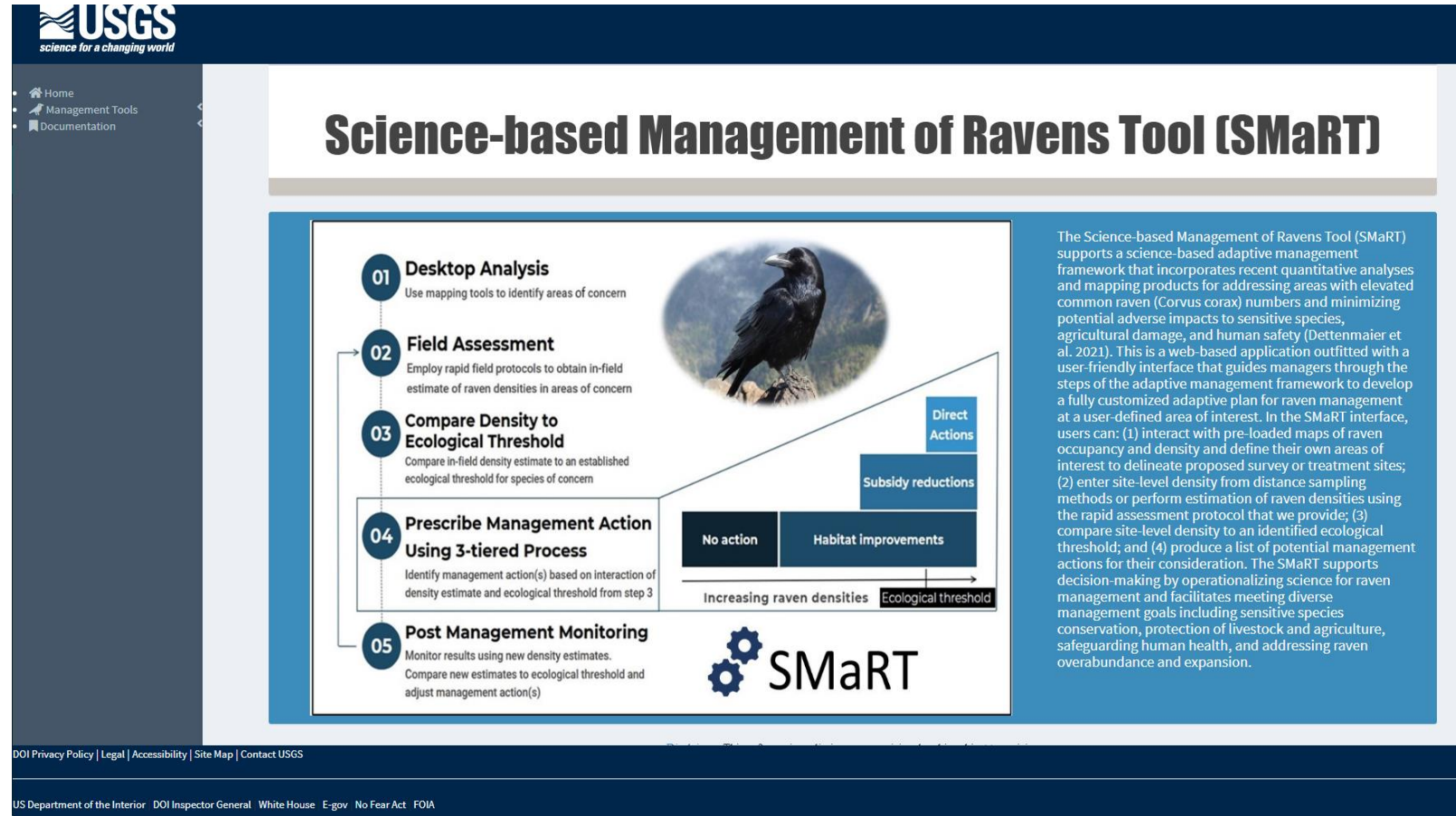
- Capture or killing of birds cannot be the primary methods used to address depredation and will only be authorized in conjunction with ongoing ***nonlethal measures***.

• Nonlethal measures include:

- Harassment (loud noises, pyrotechnics, propane cannons, scarecrows, dogs, trained raptors)
- Habitat management (sagebrush restoration and understory establishment/improvement)
- Cultural practices (seasonal timing restrictions, landscape placement)
- Policies (no feeding policies)

# Science-based Management of Ravens Tool (SMaRT)

1. Upload potential raven treatment sites
2. Identify raven density in each site:
  - Distance sampling models (requires modeled data)
  - Rapid Assessment Function (requires survey data)
  - Density map
3. Set ecological threshold
  - Sage-grouse
  - Desert tortoise
4. Get Management Tiers
  - Target sites in Tier 3 – direct actions
5. Further refine site boundaries with additional sage-grouse demographic data
  - Sage-grouse concentration areas
  - Impacted breeding sites
  - Sage-grouse sinks



**Science-based Management of Ravens Tool (SMaRT)**

The Science-based Management of Ravens Tool (SMaRT) supports a science-based adaptive management framework that incorporates recent quantitative analyses and mapping products for addressing areas with elevated common raven (*Corvus corax*) numbers and minimizing potential adverse impacts to sensitive species, agricultural damage, and human safety (Dettenmaier et al. 2021). This is a web-based application outfitted with a user-friendly interface that guides managers through the steps of the adaptive management framework to develop a fully customized adaptive plan for raven management at a user-defined area of interest. In the SMaRT interface, users can: (1) interact with pre-loaded maps of raven occupancy and density and define their own areas of interest to delineate proposed survey or treatment sites; (2) enter site-level density from distance sampling methods or perform estimation of raven densities using the rapid assessment protocol that we provide; (3) compare site-level density to an identified ecological threshold; and (4) produce a list of potential management actions for their consideration. The SMaRT supports decision-making by operationalizing science for raven management and facilitates meeting diverse management goals including sensitive species conservation, protection of livestock and agriculture, safeguarding human health, and addressing raven overabundance and expansion.

**01 Desktop Analysis**  
Use mapping tools to identify areas of concern

**02 Field Assessment**  
Employ rapid field protocols to obtain in-field estimate of raven densities in areas of concern

**03 Compare Density to Ecological Threshold**  
Compare in-field density estimate to an established ecological threshold for species of concern

**04 Prescribe Management Action Using 3-tiered Process**  
Identify management action(s) based on interaction of density estimate and ecological threshold from step 3

**05 Post Management Monitoring**  
Monitor results using new density estimates. Compare new estimates to ecological threshold and adjust management action(s)

**Management Action Matrix:**

No action	Habitat improvements	Subsidy reductions	Direct Actions
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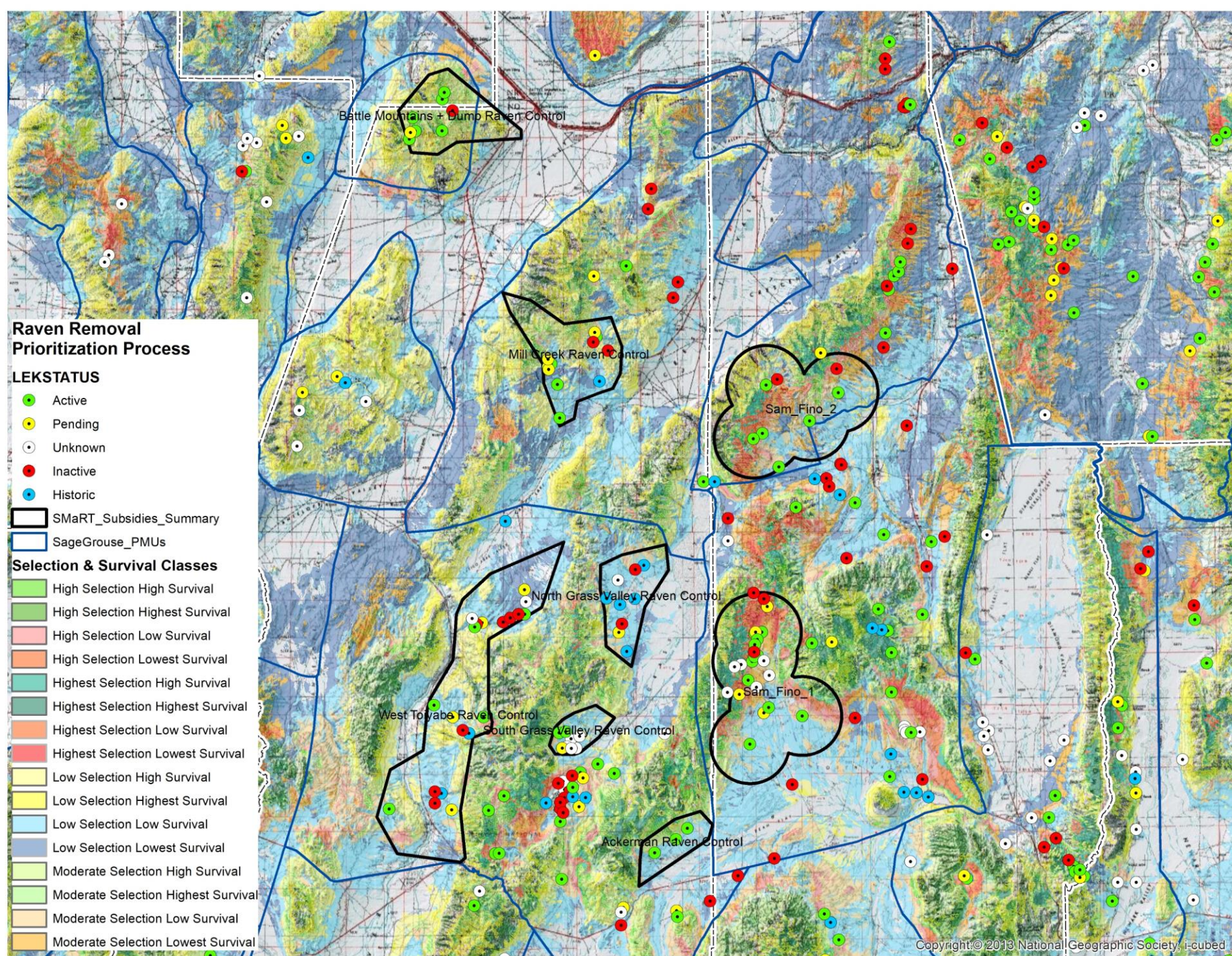
Increasing raven densities → Ecological threshold

**SMaRT**

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# Sage-grouse Source/Sink Habitats



# Science-based Management of Ravens Tool (SMaRT)

1. Upload potential raven treatment sites
2. Identify raven density in each site:
  - Distance sampling models (requires modeled data)
  - Rapid Assessment Function (requires survey data)
  - Density map

Upload shapefile

Get density

Coates, P.S., O'Neil, S.T., Brussee, B.E., Ricca, M.A., Jackson, P.J., Dinkins, J.B., Howe, K.B., Moser, A.M., Foster, L.J., and Delehanty, D.J., 2020, Data maps of predicted raven density and areas of potential impact to nesting sage-grouse within sagebrush ecosystems of the North American Great Basin: U.S. Geological Survey data release, <https://doi.org/10.5066/P9T5JT8N>.

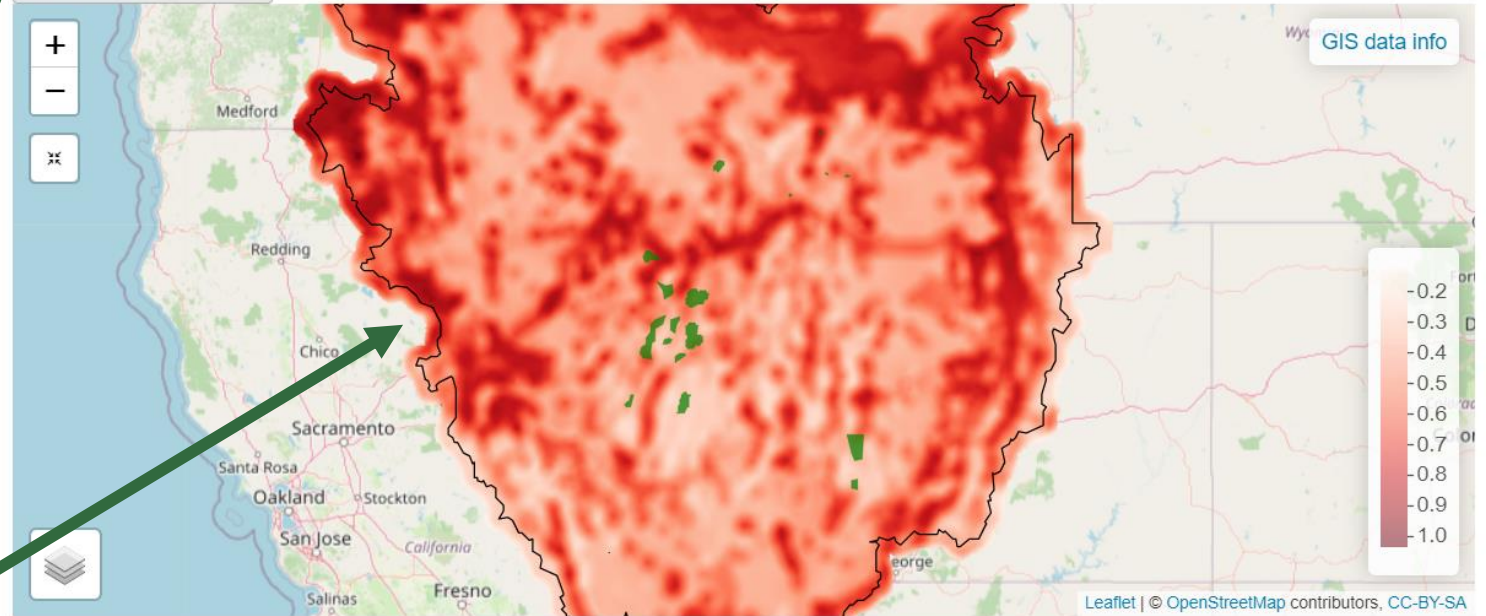
Calculate density with density surface

shapefile path

Browse 4 files

Upload complete

Calculate Site Density



Disclaimer: This software is preliminary or provisional and is subject to revision

### 3. Set ecological threshold

- Sage-grouse
- Desert tortoise

Sage-grouse threshold

Plot of all raven densities by site. Colors correspond to management tiers

The screenshot shows the 'Threshold' step of the SMaRT tool. A dropdown menu is set to 'sage-grouse', and a blue box displays a threshold of '0.4 ravens/km2' with the citation 'Coates et al. 2020'. A 'Save threshold' button is visible. To the right, a scatter plot titled 'Raven Density' shows data points for 18 sites. A horizontal dashed pink line is drawn at a density of 0.4. The legend indicates four management tiers: Tier 0 (blue), Tier 1 (yellow), Tier 2 (orange), and Tier 3 (red). The data points are colored according to these tiers based on their density relative to the 0.4 threshold.

Site	Density (ravens/km2)	Tier
Site_1	0.56	Tier 3
Site_2	0.40	Tier 0
Site_3	0.47	Tier 3
Site_4	0.88	Tier 3
Site_5	0.29	Tier 0
Site_6	0.37	Tier 0
Site_7	0.42	Tier 2
Site_8	0.46	Tier 3
Site_9	0.35	Tier 0
Site_10	0.53	Tier 3
Site_11	0.44	Tier 2
Site_12	0.35	Tier 0
Site_13	0.46	Tier 3
Site_14	0.41	Tier 2
Site_15	0.38	Tier 0
Site_16	0.63	Tier 3
Site_17	0.41	Tier 2
Site_18	0.40	Tier 2

Disclaimer: This software is preliminary or provisional and is subject to revision

### 3. Get Management Tiers

- Target sites in Tier 3 – direct actions

Site\_17

Show 10 entries

	Tier	Target.Species	Management.Category	Management.Method	Management.Option	Resource.Type	Target	SOURCE
1	Below Threshold	General	Monitoring	Raven surveys	Continue raven surveys			Created by user on 2022-08-18 using the USGS SMaRT tool https://doi.org/10.5066/P9

Showing 1 to 1 of 1 entries

Download Tiers Table

Site 17 in tier 0 – site may warrant continued monitoring

Site 16 in tier 3 – site may warrant any combination of monitoring, habitat improvement, subsidy reduction, direct action

Site\_16

Site\_17

Show 10 entries

	Tier	Target.Species	Management.Category	Management.Method	Management.Option	Resource.Type	Target	SOURCE
81	Tier 3 - Direct Actions	CORA	Raven Density	Raven Removal	Implement corvicides near sewage ponds	Adult	Impervious - Ponds	Created by user on 2022-08-18 using the USGS SMaRT tool https://doi.org/10.5066/P9
82	Tier 3 - Direct Actions	CORA	Raven Density	Raven Removal, Nest Reduction	Target nesting adults to harvest	Reproduction	Ravens	Created by user on 2022-08-18 using the USGS SMaRT tool https://doi.org/10.5066/P9
83	Tier 3 - Direct Actions	CORA	Raven Density	Raven Removal, Nest Reduction	Target nesting adults with corvicides	Reproduction	Ravens	Created by user on 2022-08-18 using the USGS SMaRT tool https://doi.org/10.5066/P9
84	Tier 3 - Direct Actions	CORA	Raven Density	Raven Removal, Nest Reduction	Remove nests and/or nestlings	Reproduction	Ravens	Created by user on 2022-08-18 using the USGS SMaRT tool https://doi.org/10.5066/P9

Showing 71 to 74 of 74 entries

Download Tiers Table

5. Further refine site boundaries with additional sage-grouse demographic data

- Sage-grouse concentration areas<sup>1</sup>
- Raven impacted breeding sites<sup>2</sup>
- Sage-grouse nest sinks<sup>3</sup>

<sup>1</sup>Coates, P.S., Ricca, M.A., Prochazka, B.G., Doherty, K.E., Brooks, M.L., and Casazza, M.L., 2015, Long-term effects of wildfire on greater sage-grouse—Integrating population and ecosystem concepts for management in the Great Basin: U.S. Geological Survey data release, <http://dx.doi.org/10.5066/F7K35RRS>.

<sup>2</sup>Coates, P.S., O'Neil, S.T., Brussee, B.E., Ricca, M.A., Jackson, P.J., Dinkins, J.B., Howe, K.B., Moser, A.M., Foster, L.J., and Delehanty, D.J., 2020, Data maps of predicted raven density and areas of potential impact to nesting sage-grouse within sagebrush ecosystems of the North American Great Basin: U.S. Geological Survey data release, <https://doi.org/10.5066/P9T5JT8N>.

<sup>3</sup>Coates, P.S., O'Neil, S.T., Brussee, B.E., Ricca, M.A., Espinosa, S.P., Gardner, S.C., and Delehanty, D.J., 2020, Spatially-explicit predictive maps of greater sage-grouse nest selection integrated with nest survival in Nevada and northeastern California, USA: U.S. Geological Survey data release, <https://doi.org/10.5066/P9TE06L4>.

